Bab 4

Pengumpulan Dan Pengolahan Data

4.1. Pengumpulan Data

Data yang diambil adalah data produk polyster dari hasil penjualan tahun 2010-2011 pada PT. Sipatex Putri Lestari. Data ini digunakan sebagai input dalam menentukan metode peramalaan.

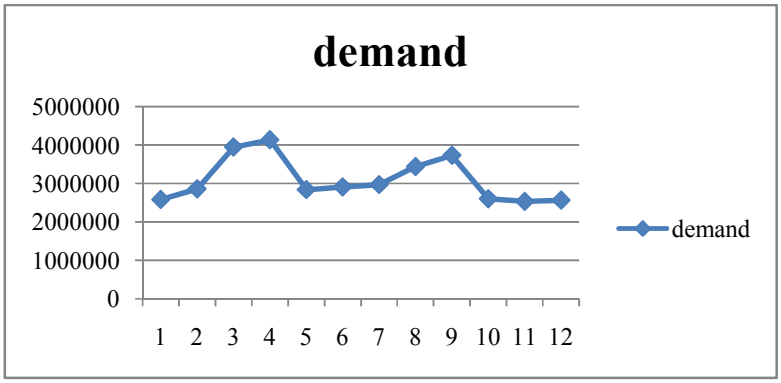
Tabel 4.1. Demand penjualan *Polyster* 1 tahun kebelakang

Tahun	**Bulan**	**Demand Polyster (meter)**		**Total (meter)**
		Printing	***Dyeing***	
2010	April	1388205	1199055	2587260
	Mei	1368540	1493850	2862390
	Juni	2030835	1918395	3949230
	Juli	2062170	2075910	4138080
	Agustus	1500840	1340820	2841660
	September	1605720	1308135	2913855
	Oktober	1635075	1338570	2973645
	November	1882170	1559625	3441795
	Desember	1801110	1933950	3735060
2011	Januari	1415295	1190310	2605605
	Februari	1340205	1196445	2536650
	Maret	1376205	1193820	2570025

Tabel 4.2. Daftar harga

Jenis Polyster	Harga /Meter
Printing	Rp.18.000
Dyeing	Rp.17.000

Plot data merupakan suatu langkah yang harus dilakukan untuk mengetahui model peramalan yang sesuai dengan karakteristik data, apakah berbentuk pola trend, horizontal, musiman atau siklis. Dengan plot data ini dapat dilihat bahwa yang cocok untuk melakukan peramalan polyster di PT. Sipatex Putri Lestari ini menggunakan pola dat musiman karena garfik penjualanya naik turun. Berikut ini adalah plot data aktual kebutuhan polyster di PT. Sipatex Putri Lestari.



Gambar 4.1.1. Plot Data Awal

Data dibawah ini adalah data *Actual Order*, *Inventory,* produk polyster pada PT. Sipatex Putri Lestari. Data ini digunakan sebagai input dalam menghitung *MPS*

Tabel 4.3. *Actual Order*

Tahun	Bulan	Printing (meter)	Dyeing (meter)
2011	April	854700	854340
	Mei	824790	865410
	Juni	1125210	1121340
	Juli	1178550	1157340
	Agustus	884220	859410
	September	802020	823920
	Oktober	824490	808590
	November	794610	823650
	Desember	1097520	1169340
2012	Januari	1129770	1153740
	Februari	827550	794970
	Maret	899220	839790

Tabel 4.4. *Inventory*

Item	*Inventory* (meter)
Printing	903930
dyeing	780780

Data dibawah ini adalah data hari dan jam kerja, data *Work Center*, data *Run Time* produk polyster pada PT. Sipatex Putri Lestari. Data ini digunakan sebagai input dalam menghitung *RCCP*.

Tabel 4.5. Data hari kerja dan jam kerja

Tahun	Bulan	Hari kerja	Jam kerja/hari
2011	April	30	24
	Mei	31	24
	Juni	30	24
	Juli	31	24
	Agustus	31	24
	September	30	24
	Oktober	31	24
	November	30	24
	Desember	31	24
2012	Januari	31	24
	Februari	29	24
	Maret	31	24

Tabeel 4.6. Data *Work Center*

Work Center	Set up time (detik)	Lot Size (meter)	Tenaga Kerja
1	1200	1000	150
2	300	1000	80
3	600	1000	125
4	300	1000	85
5	900	1000	120
6	600	1000	100

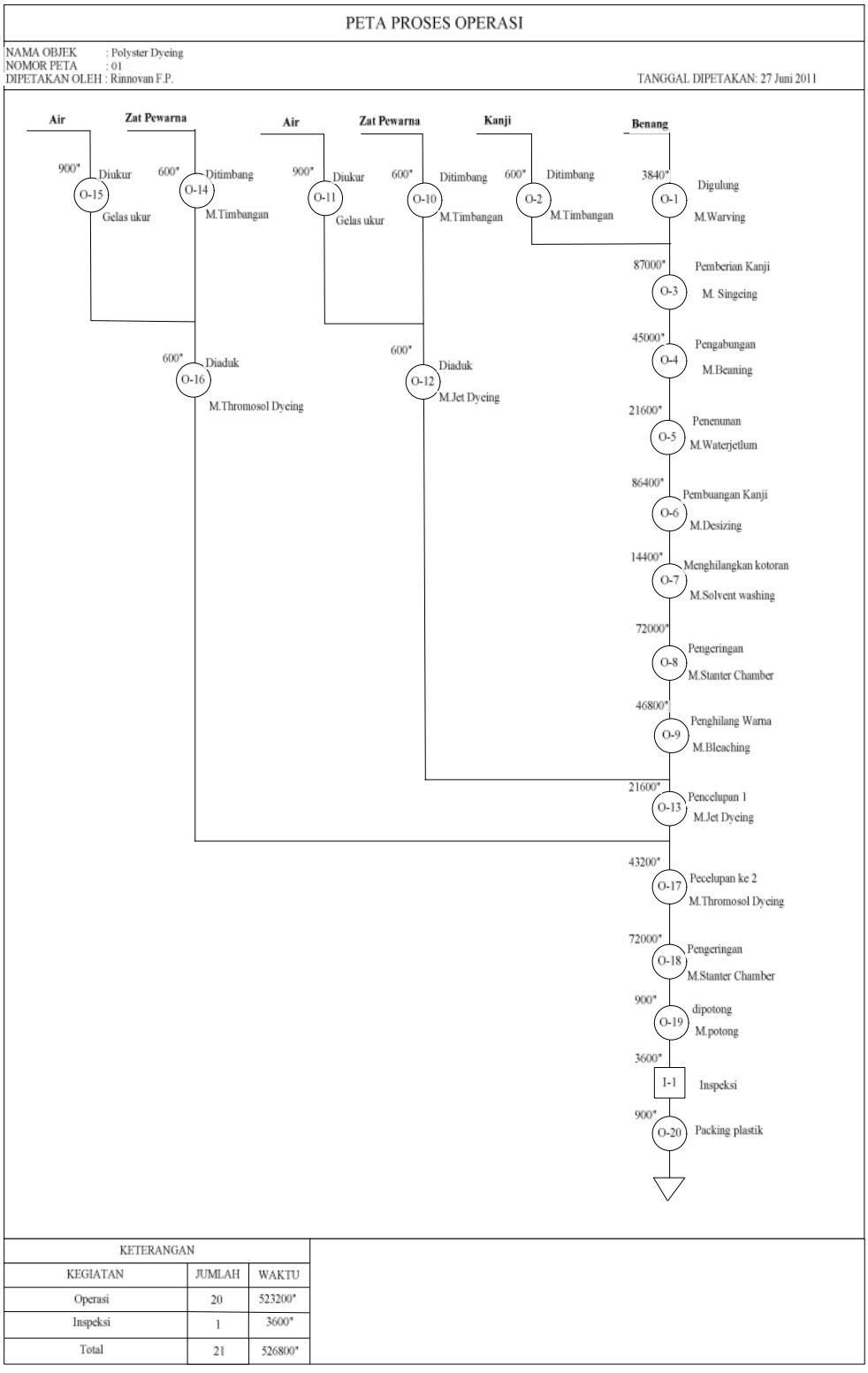
Tabel 4.7. Data *Run Time*

Item	*Work Center*	Operasi	*Run Time* (detik)
Polyster Dyeing	SP1	1-5	158040
	SP2	6	86400
	SP3	7-8	86400
	SP4	9	46800
	SP5	10-15	140160
	SP6	16-20	5400
Polyster Printing	SP1	1-5	158040
	SP2	6	86400
	SP3	7-8	86400
	SP4	9	46800
	SP5	10-15	96960
	SP6	16-20	5400

Data dibawah ini adalah kebutuhan material per satuan Produksi dan *OPC* produk polyster pada PT. Sipatex Putri Lestari. Data ini digunakan sebagai input dalam menghitung MRP

Tabel 4.8. Kebutuhan material per satuan produksi

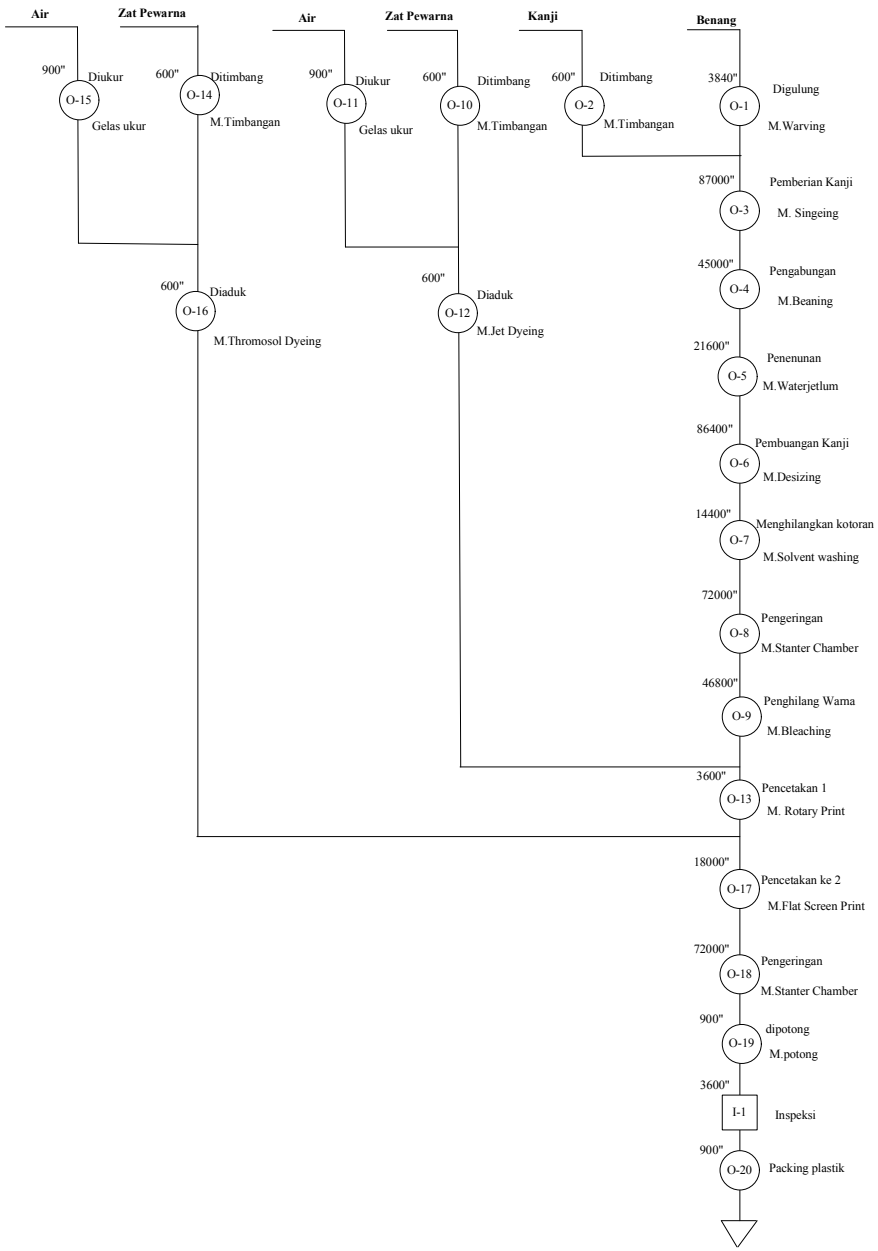
Nama Komponen	Satuan	kebutuhan /produksi	Inventory	Ongkos Pesan (Rp)
Benang	Ton	0,3 ton	725 Ton	1500000
Zat pewarna 1	Ton	0,02 ton	50 Ton	500000
Zat pewarna 2	Ton	0,04 ton	105 Ton	500000
Kanji	Ton	0,01 ton	25 Ton	700000
Packing Plastic	Ton	0,002 ton	6 Ton	900000



Gambar 4.1.2. *OPC Polyster Dyeing*

PETA PROSES OPERASI

NAMA OBJEK : Polyster Printing
NOMOR PETA : 01
DIPETAKAN OLEH : Rinnovan F.P.
TANGGAL DIPETAKAN: 27 Juni 2011



KETERANGAN		
KEGIATAN	JUMLAH	WAKTU
Operasi	20	523200"
Inspeksi	1	3600"
Total	21	483600"

Gambar 4.1.3. *OPC Polyster Printing*

4.2. Pengolahan Data

4.2.1. Proses Agregasi

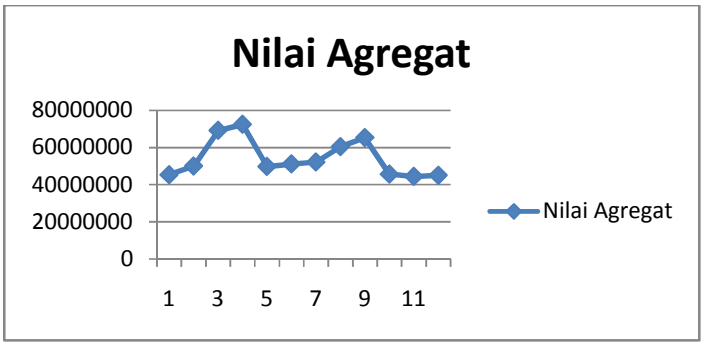
Proses agregasi adalah langkah pertama dalam melakukan peramalan. Agregasi dilakukan dengan mengkonversikan semua produk menjadi satu kesatuan yang disebut unit agregat. Unit agregat yang dipakai dalam penelitian ini yaitu satuan harga jual.

Rumus:

Unit agregat = data penjualan x harga jual

Tabel 4.9. Unit Agregat

Periode	Per seribu rupiah		
	Printing	Dyeing	Total
1	24987690	20383935	45371625
2	24633720	25395450	50029170
3	36555030	32612715	69167745
4	37119060	35290470	72409530
5	27015120	22793940	49809060
6	28902960	22238295	51141255
7	29431350	22755690	52187040
8	33879060	26513625	60392685
9	32419980	32877150	65297130
10	25475310	20235270	45710580
11	24123690	20339565	44463255
12	24771690	20294940	45066630
Total	349314660	301731045	651045705
%	55.07%	44.93%	100%



Gambar 4.2.1.1. Plot data Unit Agregat

4.2.2. Peramalan

Setelah dilakukan plot data unit agregat, dapat dilihat bahwa data menunjukkan pola data musiman yang berarti hanya dapat diramalkan menggunakan 3 metode, yaitu metode Winter, metode kuadratik dan regresi linear. Langkah selanjutnya adalah melakukan peramalan untuk 12 periode kedepan pada produk polyster di PT.SIPATEX PUTRI LESTARI dengan menggunakan 3 metode peramalan tersebut yang dibantu dengan *software* WIN QSB dan Microsoft Excel.

4.2.2.1. Metode Winter

Tabel 4.10. Metode *Winter* dengan α = 0,9 β =0,1 γ = 0,1

Periode	Demand	St	It	bt	Ft	forecast error	CFE	MAD	MSE	Trk Signal
1	45371625		0.81							
2	50029170	45371625	0.89							
3	69167745	49563416	1.23							
4	72409530	67207312	1.29							
5	49809060	71889308	0.88							
6	51141255	52017085	0.91	-689196						
7	52187040	51327889	0.81	521638.9	51523453	663586.6373	663586.6373	663586.6373	2.43E+13	1
8	60392685	51849527.9	0.89	884380.8	60820245	-427559.6006	236027.0366	545573.119	1.95E+13	0.432622
9	65297130	52733908.7	1.22	-492621	66571127	-1273997.162	-1037970.125	788381.1331	9.47E+12	-1.31658
10	45710580	52241287.7	1.28	-2171351	45317049	393530.813	-644439.3119	689668.5531	1.84E+13	-0.93442
11	44463255	50069936.7	0.89	-818808	42410068	2053187.128	1408747.816	962372.2682	1.32E+13	1.463828
12	45066630	49251128.7	0.91	-667927	44307909	758720.5646	2167468.381	928430.3176	1.34E+13	2.3345515
13					39392569					
14					42776607					
15					58122175					
16					59858352					
17					40916621					
18					41289426					
19					39392569					
20					42776607					
21					58122175					
22					59858352					
23					40916621					
24					41289426					

Contoh perhitungan winter:

S_t $= \alpha \frac{Xt}{It-L} + (1 - \alpha)(S_{t-1} + b_{t-1})$

S_{t12} $= 0,9 \frac{X12}{I6} + (1 - 0,2)(S_{11} + b_{11})$

$= 0,2 \frac{45066630}{0,91} + (1-0,9)(50069936.7 + (-818808))$

$= 49251128.7$

b_t = γ(S_t- S_{t-1})+(1- γ) b_{t-1}

b_{12} = 0,1(S_{12}- S_{11})+(1- 0,1) b_{11}

= 0,1(49251128.7-50069936.7)+(1- 0,1) (-818808)

= - 667927

I_t = β$\frac{X_t}{S_t}$ +(1- β) I_{t-L}

I_{12} = 0,1$\frac{X_{12}}{S_{12}}$ +(1- 0,1) I_6

= 0,1 $\frac{45066630}{49251128.7}$ + (1- 0,1) 0,91

= 0.91

F_{t+m} = (S_t+b_tm) I_{t-L+m}

F_{13} = (S_{12}+b_{12}(1)) I_7

= (49251128.7 + (- 667927x 1)) 0.81

= 39392569

Tabel 4.11. Hasil perhitungan Metode Winter dengan Trial Error

No	α	β	γ	CFE	MAD	MSE	Trk Signal	R-Square
1	0.1	0.1	0.1	4728107.377	7232800.89	5.23134E+13	0.6537035	0.112
2	0.1	0.1	0.2	1349671.856	7363694.984	5.4224E+13	0.1832873	0.106
3	0.1	0.1	0.3	-1805636.574	7732369.274	5.97895E+13	-0.2335166	0.101
4	0.1	0.1	0.4	-4745193.14	8065881.631	6.50584E+13	-0.5883043	0.099
5	0.1	0.1	0.5	-7476227.05	8365436.924	6.99805E+13	-0.8937043	0.097
6	0.1	0.1	0.6	-10005823.18	8632215.965	7.45152E+13	-1.1591257	0.097
7	0.1	0.1	0.7	-12340923.73	8867375.789	7.86304E+13	-1.3917222	0.099
8	0.1	0.1	0.8	-14488329.91	9072049.928	8.23021E+13	-1.5970293	0.101
9	0.1	0.1	0.9	-16454703.56	9247348.692	8.55135E+13	-1.7793969	0.104
10	0.1	0.2	0.1	4728107.377	7232800.89	5.23134E+13	0.6537035	0.112
11	0.1	0.2	0.2	1349671.856	7363694.984	5.4224E+13	0.1832873	0.106
12	0.1	0.2	0.3	-1805636.574	7732369.274	5.97895E+13	-0.2335166	0.101
13	0.1	0.2	0.4	-4745193.14	8065881.631	6.50584E+13	-0.5883043	0.099
14	0.1	0.2	0.5	-7476227.05	8365436.924	6.99805E+13	-0.8937043	0.097
15	0.1	0.2	0.6	-10005823.18	8632215.965	7.45152E+13	-1.1591257	0.097
16	0.1	0.2	0.7	-12340923.73	8867375.789	7.86304E+13	-1.3917222	0.099
17	0.1	0.2	0.8	-14488329.91	9072049.928	8.23021E+13	-1.5970293	0.101
18	0.1	0.2	0.9	-16454703.56	9247348.692	8.55135E+13	-1.7793969	0.104
19	0.1	0.3	0.1	4728107.377	7232800.89	5.23134E+13	0.6537035	0.112
20	0.1	0.3	0.2	1349671.856	7363694.984	5.4224E+13	0.1832873	0.106
21	0.1	0.3	0.3	-1805636.574	7732369.274	5.97895E+13	-0.2335166	0.101
22	0.1	0.3	0.4	-4745193.14	8065881.631	6.50584E+13	-0.5883043	0.099
23	0.1	0.3	0.5	-7476227.05	8365436.924	6.99805E+13	-0.8937043	0.097
24	0.1	0.3	0.6	-10005823.18	8632215.965	7.45152E+13	-1.1591257	0.097
25	0.1	0.3	0.7	-12340923.73	8867375.789	7.86304E+13	-1.3917222	0.099
26	0.1	0.3	0.8	-14488329.91	9072049.928	8.23021E+13	-1.5970293	0.101
27	0.1	0.3	0.9	-16454703.56	9247348.692	8.55135E+13	-1.7793969	0.104
28	0.1	0.4	0.1	4728107.377	7232800.89	5.23134E+13	0.6537035	0.112
29	0.1	0.4	0.2	1349671.856	7363694.984	5.4224E+13	0.1832873	0.106
30	0.1	0.4	0.3	-1805636.574	7732369.274	5.97895E+13	-0.2335166	0.101
31	0.1	0.4	0.4	-4745193.14	8065881.631	6.50584E+13	-0.5883043	0.099
32	0.1	0.4	0.5	-7476227.05	8365436.924	6.99805E+13	-0.8937043	0.097
33	0.1	0.4	0.6	-10005823.18	8632215.965	7.45152E+13	-1.1591257	0.097
34	0.1	0.4	0.7	-12340923.73	8867375.789	7.86304E+13	-1.3917222	0.099
35	0.1	0.4	0.8	-14488329.91	9072049.928	8.23021E+13	-1.5970293	0.101
36	0.1	0.4	0.9	-16454703.56	9247348.692	8.55135E+13	-1.7793969	0.104
37	0.1	0.5	0.1	4728107.377	7232800.89	5.23134E+13	0.6537035	0.112
38	0.1	0.5	0.2	1349671.856	7363694.984	5.4224E+13	0.1832873	0.106
39	0.1	0.5	0.3	-1805636.574	7732369.274	5.97895E+13	-0.2335166	0.101
40	0.1	0.5	0.4	-4745193.14	8065881.631	6.50584E+13	-0.5883043	0.099
41	0.1	0.5	0.5	-7476227.05	8365436.924	6.99805E+13	-0.8937043	0.097
42	0.1	0.5	0.6	-10005823.18	8632215.965	7.45152E+13	-1.1591257	0.097
43	0.1	0.5	0.7	-12340923.73	8867375.789	7.86304E+13	-1.3917222	0.099
44	0.1	0.5	0.8	-14488329.91	9072049.928	8.23021E+13	-1.5970293	0.101
45	0.1	0.5	0.9	-16454703.56	9247348.692	8.55135E+13	-1.7793969	0.104
46	0.1	0.6	0.1	4728107.377	7232800.89	5.23134E+13	0.6537035	0.112
47	0.1	0.6	0.2	1349671.856	7363694.984	5.4224E+13	0.1832873	0.106

No	α	β	γ	CFE	MAD	MSE	Trk Signal	R-Square
48	0.1	0.6	0.3	-1805636.574	7732369.274	5.97895E+13	-0.2335166	0.101
49	0.1	0.6	0.4	-4745193.14	8065881.631	6.50584E+13	-0.5883043	0.099
50	0.1	0.6	0.5	-7476227.05	8365436.924	6.99805E+13	-0.8937043	0.097
51	0.1	0.6	0.6	-10005823.18	8632215.965	7.45152E+13	-1.1591257	0.097
52	0.1	0.6	0.7	-12340923.73	8867375.789	7.86304E+13	-1.3917222	0.099
53	0.1	0.6	0.8	-14488329.91	9072049.928	8.23021E+13	-1.5970293	0.101
54	0.1	0.6	0.9	-16454703.56	9247348.692	8.55135E+13	-1.7793969	0.104
55	0.1	0.7	0.1	4728107.377	7232800.89	5.23134E+13	0.6537035	0.112
56	0.1	0.7	0.2	1349671.856	7363694.984	5.4224E+13	0.1832873	0.106
57	0.1	0.7	0.3	-1805636.574	7732369.274	5.97895E+13	-0.2335166	0.101
58	0.1	0.7	0.4	-4745193.14	8065881.631	6.50584E+13	-0.5883043	0.099
59	0.1	0.7	0.5	-7476227.05	8365436.924	6.99805E+13	-0.8937043	0.097
60	0.1	0.7	0.6	-10005823.18	8632215.965	7.45152E+13	-1.1591257	0.097
61	0.1	0.7	0.7	-12340923.73	8867375.789	7.86304E+13	-1.3917222	0.099
62	0.1	0.7	0.8	-14488329.91	9072049.928	8.23021E+13	-1.5970293	0.101
63	0.1	0.7	0.9	-16454703.56	9247348.692	8.55135E+13	-1.7793969	0.104
64	0.1	0.8	0.1	4728107.377	7232800.89	5.23134E+13	0.6537035	0.112
65	0.1	0.8	0.2	1349671.856	7363694.984	5.4224E+13	0.1832873	0.106
66	0.1	0.8	0.3	-1805636.574	7732369.274	5.97895E+13	-0.2335166	0.101
67	0.1	0.8	0.4	-4745193.14	8065881.631	6.50584E+13	-0.5883043	0.099
68	0.1	0.8	0.5	-7476227.05	8365436.924	6.99805E+13	-0.8937043	0.097
69	0.1	0.8	0.6	-10005823.18	8632215.965	7.45152E+13	-1.1591257	0.097
70	0.1	0.8	0.7	-12340923.73	8867375.789	7.86304E+13	-1.3917222	0.099
71	0.1	0.8	0.8	-14488329.91	9072049.928	8.23021E+13	-1.5970293	0.101
72	0.1	0.8	0.9	-16454703.56	9247348.692	8.55135E+13	-1.7793969	0.104
73	0.1	0.9	0.1	4728107.377	7232800.89	5.23134E+13	0.6537035	0.112
74	0.1	0.9	0.2	1349671.856	7363694.984	5.4224E+13	0.1832873	0.106
75	0.1	0.9	0.3	-1805636.574	7732369.274	5.97895E+13	-0.2335166	0.101
76	0.1	0.9	0.4	-4745193.14	8065881.631	6.50584E+13	-0.5883043	0.099
77	0.1	0.9	0.5	-7476227.05	8365436.924	6.99805E+13	-0.8937043	0.097
78	0.1	0.9	0.6	-10005823.18	8632215.965	7.45152E+13	-1.1591257	0.097
79	0.1	0.9	0.7	-12340923.73	8867375.789	7.86304E+13	-1.3917222	0.099
80	0.1	0.9	0.8	-14488329.91	9072049.928	8.23021E+13	-1.5970293	0.101
81	0.1	0.9	0.9	-16454703.56	9247348.692	8.55135E+13	-1.7793969	0.104
82	0.2	0.1	0.1	-3054092.972	7038176.808	4.95359E+13	-0.4339324	0.192
83	0.2	0.1	0.2	-7336614.92	7375822.824	5.44028E+13	-0.9946843	0.193
84	0.2	0.1	0.3	-10958936.93	7685040.052	5.90598E+13	-1.4260091	0.199
85	0.2	0.1	0.4	-13968525.87	7895321.948	6.23361E+13	-1.7692155	0.209
86	0.2	0.1	0.5	-16410827.07	8014242.734	6.42281E+13	-2.0477078	0.223
87	0.2	0.1	0.6	-18329314.3	8049048.037	6.47872E+13	-2.2772027	0.240
88	0.2	0.1	0.7	-19765539.09	8006663.114	6.41067E+13	-2.4686363	0.26
89	0.2	0.1	0.8	-20759179.56	8476638.003	7.18534E+13	-2.4489874	0.282
90	0.2	0.1	0.9	-21348088.67	8576961.325	7.35643E+13	-2.4890037	0.306
91	0.2	0.2	0.1	-3054092.972	7038176.808	4.95359E+13	-0.4339324	0.192
92	0.2	0.2	0.2	-7336614.92	7375822.824	5.44028E+13	-0.9946843	0.193
93	0.2	0.2	0.3	-10958936.93	7685040.052	5.90598E+13	-1.4260091	0.199
94	0.2	0.2	0.4	-13968525.87	7895321.948	6.23361E+13	-1.7692155	0.209
95	0.2	0.2	0.5	-16410827.07	8014242.734	6.42281E+13	-2.0477078	0.223
96	0.2	0.2	0.6	-18329314.3	8049048.037	6.47872E+13	-2.2772027	0.240
97	0.2	0.2	0.7	-19765539.09	8006663.114	6.41067E+13	-2.4686363	0.26

No	α	β	γ	CFE	MAD	MSE	Trk Signal	R-Square
98	0.2	0.2	0.8	-20759179.56	8476638.003	7.18534E+13	-2.4489874	0.282
99	0.2	0.2	0.9	-21348088.67	8576961.325	7.35643E+13	-2.4890037	0.306
100	0.2	0.3	0.1	-3054092.972	7038176.808	4.95359E+13	-0.4339324	0.192
101	0.2	0.3	0.2	-7336614.92	7375822.824	5.44028E+13	-0.9946843	0.193
102	0.2	0.3	0.3	-10958936.93	7685040.052	5.90598E+13	-1.4260091	0.199
103	0.2	0.3	0.4	-13968525.87	7895321.948	6.23361E+13	-1.7692155	0.209
104	0.2	0.3	0.5	-16410827.07	8014242.734	6.42281E+13	-2.0477078	0.223
105	0.2	0.3	0.6	-18329314.3	8049048.037	6.47872E+13	-2.2772027	0.240
106	0.2	0.3	0.7	-19765539.09	8006663.114	6.41067E+13	-2.4686363	0.26
107	0.2	0.3	0.8	-20759179.56	8476638.003	7.18534E+13	-2.4489874	0.282
108	0.2	0.3	0.9	-21348088.67	8576961.325	7.35643E+13	-2.4890037	0.306
109	0.2	0.4	0.1	-3054092.972	7038176.808	4.95359E+13	-0.4339324	0.192
110	0.2	0.4	0.2	-7336614.92	7375822.824	5.44028E+13	-0.9946843	0.193
111	0.2	0.4	0.3	-10958936.93	7685040.052	5.90598E+13	-1.4260091	0.199
112	0.2	0.4	0.4	-13968525.87	7895321.948	6.23361E+13	-1.7692155	0.209
113	0.2	0.4	0.5	-16410827.07	8014242.734	6.42281E+13	-2.0477078	0.223
114	0.2	0.4	0.6	-18329314.3	8049048.037	6.47872E+13	-2.2772027	0.240
115	0.2	0.4	0.7	-19765539.09	8006663.114	6.41067E+13	-2.4686363	0.26
116	0.2	0.4	0.8	-20759179.56	8476638.003	7.18534E+13	-2.4489874	0.282
117	0.2	0.4	0.9	-21348088.67	8576961.325	7.35643E+13	-2.4890037	0.306
118	0.2	0.5	0.1	-3054092.972	7038176.808	4.95359E+13	-0.4339324	0.192
119	0.2	0.5	0.2	-7336614.92	7375822.824	5.44028E+13	-0.9946843	0.193
120	0.2	0.5	0.3	-10958936.93	7685040.052	5.90598E+13	-1.4260091	0.199
121	0.2	0.5	0.4	-13968525.87	7895321.948	6.23361E+13	-1.7692155	0.209
122	0.2	0.5	0.5	-16410827.07	8014242.734	6.42281E+13	-2.0477078	0.223
123	0.2	0.5	0.6	-18329314.3	8049048.037	6.47872E+13	-2.2772027	0.240
124	0.2	0.5	0.7	-19765539.09	8006663.114	6.41067E+13	-2.4686363	0.26
125	0.2	0.5	0.8	-20759179.56	8476638.003	7.18534E+13	-2.4489874	0.282
126	0.2	0.5	0.9	-21348088.67	8576961.325	7.35643E+13	-2.4890037	0.306
127	0.2	0.6	0.1	-3054092.972	7038176.808	4.95359E+13	-0.4339324	0.192
128	0.2	0.6	0.2	-7336614.92	7375822.824	5.44028E+13	-0.9946843	0.193
129	0.2	0.6	0.3	-10958936.93	7685040.052	5.90598E+13	-1.4260091	0.199
130	0.2	0.6	0.4	-13968525.87	7895321.948	6.23361E+13	-1.7692155	0.209
131	0.2	0.6	0.5	-16410827.07	8014242.734	6.42281E+13	-2.0477078	0.223
132	0.2	0.6	0.6	-18329314.3	8049048.037	6.47872E+13	-2.2772027	0.240
133	0.2	0.6	0.7	-19765539.09	8006663.114	6.41067E+13	-2.4686363	0.26
134	0.2	0.6	0.8	-20759179.56	8476638.003	7.18534E+13	-2.4489874	0.282
135	0.2	0.6	0.9	-21348088.67	8576961.325	7.35643E+13	-2.4890037	0.306
136	0.2	0.7	0.1	-3054092.972	7038176.808	4.95359E+13	-0.4339324	0.192
137	0.2	0.7	0.2	-7336614.92	7375822.824	5.44028E+13	-0.9946843	0.193
138	0.2	0.7	0.3	-10958936.93	7685040.052	5.90598E+13	-1.4260091	0.199
139	0.2	0.7	0.4	-13968525.87	7895321.948	6.23361E+13	-1.7692155	0.209
140	0.2	0.7	0.5	-16410827.07	8014242.734	6.42281E+13	-2.0477078	0.223
141	0.2	0.7	0.6	-18329314.3	8049048.037	6.47872E+13	-2.2772027	0.240
142	0.2	0.7	0.7	-19765539.09	8006663.114	6.41067E+13	-2.4686363	0.26
143	0.2	0.7	0.8	-20759179.56	8476638.003	7.18534E+13	-2.4489874	0.282
144	0.2	0.7	0.9	-21348088.67	8576961.325	7.35643E+13	-2.4890037	0.306
145	0.2	0.8	0.1	-3054092.972	7038176.808	4.95359E+13	-0.4339324	0.192
146	0.2	0.8	0.2	-7336614.92	7375822.824	5.44028E+13	-0.9946843	0.193
147	0.2	0.8	0.3	-10958936.93	7685040.052	5.90598E+13	-1.4260091	0.199

No	α	β	γ	CFE	MAD	MSE	Trk Signal	R-Square
148	0.2	0.8	0.4	-13968525.87	7895321.948	6.23361E+13	-1.7692155	0.209
149	0.2	0.8	0.5	-16410827.07	8014242.734	6.42281E+13	-2.0477078	0.223
150	0.2	0.8	0.6	-18329314.3	8049048.037	6.47872E+13	-2.2772027	0.240
151	0.2	0.8	0.7	-19765539.09	8006663.114	6.41067E+13	-2.4686363	0.26
152	0.2	0.8	0.8	-20759179.56	8476638.003	7.18534E+13	-2.4489874	0.282
153	0.2	0.8	0.9	-21348088.67	8576961.325	7.35643E+13	-2.4890037	0.306
154	0.2	0.9	0.1	-3054092.972	7038176.808	4.95359E+13	-0.4339324	0.192
155	0.2	0.9	0.2	-7336614.92	7375822.824	5.44028E+13	-0.9946843	0.193
156	0.2	0.9	0.3	-10958936.93	7685040.052	5.90598E+13	-1.4260091	0.199
157	0.2	0.9	0.4	-13968525.87	7895321.948	6.23361E+13	-1.7692155	0.209
158	0.2	0.9	0.5	-16410827.07	8014242.734	6.42281E+13	-2.0477078	0.223
159	0.2	0.9	0.6	-18329314.3	8049048.037	6.47872E+13	-2.2772027	0.240
160	0.2	0.9	0.7	-19765539.09	8006663.114	6.41067E+13	-2.4686363	0.26
161	0.2	0.9	0.8	-20759179.56	8476638.003	7.18534E+13	-2.4489874	0.282
162	0.2	0.9	0.9	-21348088.67	8576961.325	7.35643E+13	-2.4890037	0.306
163	0.3	0.1	0.1	-6147813.32	6817476.382	4.6478E+13	-0.9017726	0.309
164	0.3	0.1	0.2	-9997359.87	6985911.911	4.8803E+13	-1.4310744	0.325
165	0.3	0.1	0.3	-12770855.22	7196444.262	5.17888E+13	-1.7746063	0.349
166	0.3	0.1	0.4	-14595244.44	7434215.741	5.52676E+13	-1.9632527	0.379
167	0.3	0.1	0.5	-15588711.42	7685716.777	5.90702E+13	-2.0282703	0.414
168	0.3	0.1	0.6	-15861029.12	7938727.532	6.30234E+13	-1.9979309	0.451
169	0.3	0.1	0.7	-15513903.47	8182260.586	6.69494E+13	-1.8960412	0.490
170	0.3	0.1	0.8	-14641310.88	8406504.699	7.06693E+13	-1.7416645	0.530
171	0.3	0.1	0.9	-13329829.25	8602769.625	7.40076E+13	-1.5494811	0.570
172	0.3	0.2	0.1	-6147813.32	6817476.382	4.6478E+13	-0.9017726	0.309
173	0.3	0.2	0.2	-9997359.87	6985911.911	4.8803E+13	-1.4310744	0.325
174	0.3	0.2	0.3	-12770855.22	7196444.262	5.17888E+13	-1.7746063	0.349
175	0.3	0.2	0.4	-14595244.44	7434215.741	5.52676E+13	-1.9632527	0.379
176	0.3	0.2	0.5	-15588711.42	7685716.777	5.90702E+13	-2.0282703	0.414
177	0.3	0.2	0.6	-15861029.12	7938727.532	6.30234E+13	-1.9979309	0.451
178	0.3	0.2	0.7	-15513903.47	8182260.586	6.69494E+13	-1.8960412	0.490
179	0.3	0.2	0.8	-14641310.88	8406504.699	7.06693E+13	-1.7416645	0.530
180	0.3	0.2	0.9	-13329829.25	8602769.625	7.40076E+13	-1.5494811	0.570
181	0.3	0.3	0.1	-6147813.32	6817476.382	4.6478E+13	-0.9017726	0.309
182	0.3	0.3	0.2	-9997359.87	6985911.911	4.8803E+13	-1.4310744	0.325
183	0.3	0.3	0.3	-12770855.22	7196444.262	5.17888E+13	-1.7746063	0.349
184	0.3	0.3	0.4	-14595244.44	7434215.741	5.52676E+13	-1.9632527	0.379
185	0.3	0.3	0.5	-15588711.42	7685716.777	5.90702E+13	-2.0282703	0.414
186	0.3	0.3	0.6	-15861029.12	7938727.532	6.30234E+13	-1.9979309	0.451
187	0.3	0.3	0.7	-15513903.47	8182260.586	6.69494E+13	-1.8960412	0.490
188	0.3	0.3	0.8	-14641310.88	8406504.699	7.06693E+13	-1.7416645	0.530
189	0.3	0.3	0.9	-13329829.25	8602769.625	7.40076E+13	-1.5494811	0.570
190	0.3	0.4	0.1	-6147813.32	6817476.382	4.6478E+13	-0.9017726	0.309
191	0.3	0.4	0.2	-9997359.87	6985911.911	4.8803E+13	-1.4310744	0.325
192	0.3	0.4	0.3	-12770855.22	7196444.262	5.17888E+13	-1.7746063	0.349
193	0.3	0.4	0.4	-14595244.44	7434215.741	5.52676E+13	-1.9632527	0.379
194	0.3	0.4	0.5	-15588711.42	7685716.777	5.90702E+13	-2.0282703	0.414
195	0.3	0.4	0.6	-15861029.12	7938727.532	6.30234E+13	-1.9979309	0.451
196	0.3	0.4	0.7	-15513903.47	8182260.586	6.69494E+13	-1.8960412	0.490
197	0.3	0.4	0.8	-14641310.88	8406504.699	7.06693E+13	-1.7416645	0.530

No	α	β	γ	CFE	MAD	MSE	Trk Signal	R-Square
198	0.3	0.4	0.9	-13329829.25	8602769.625	7.40076E+13	-1.5494811	0.570
199	0.3	0.5	0.1	-6147813.32	6817476.382	4.6478E+13	-0.9017726	0.309
200	0.3	0.5	0.2	-9997359.87	6985911.911	4.8803E+13	-1.4310744	0.325
201	0.3	0.5	0.3	-12770855.22	7196444.262	5.17888E+13	-1.7746063	0.349
202	0.3	0.5	0.4	-14595244.44	7434215.741	5.52676E+13	-1.9632527	0.379
203	0.3	0.5	0.5	-15588711.42	7685716.777	5.90702E+13	-2.0282703	0.414
204	0.3	0.5	0.6	-15861029.12	7938727.532	6.30234E+13	-1.9979309	0.451
205	0.3	0.5	0.7	-15513903.47	8182260.586	6.69494E+13	-1.8960412	0.490
206	0.3	0.5	0.8	-14641310.88	8406504.699	7.06693E+13	-1.7416645	0.530
207	0.3	0.5	0.9	-13329829.25	8602769.625	7.40076E+13	-1.5494811	0.570
208	0.3	0.6	0.1	-6147813.32	6817476.382	4.6478E+13	-0.9017726	0.309
209	0.3	0.6	0.2	-9997359.87	6985911.911	4.8803E+13	-1.4310744	0.325
210	0.3	0.6	0.3	-12770855.22	7196444.262	5.17888E+13	-1.7746063	0.349
211	0.3	0.6	0.4	-14595244.44	7434215.741	5.52676E+13	-1.9632527	0.379
212	0.3	0.6	0.5	-15588711.42	7685716.777	5.90702E+13	-2.0282703	0.414
213	0.3	0.6	0.6	-15861029.12	7938727.532	6.30234E+13	-1.9979309	0.451
214	0.3	0.6	0.7	-15513903.47	8182260.586	6.69494E+13	-1.8960412	0.490
215	0.3	0.6	0.8	-14641310.88	8406504.699	7.06693E+13	-1.7416645	0.530
216	0.3	0.6	0.9	-13329829.25	8602769.625	7.40076E+13	-1.5494811	0.570
217	0.3	0.7	0.1	-6147813.32	6817476.382	4.6478E+13	-0.9017726	0.309
218	0.3	0.7	0.2	-9997359.87	6985911.911	4.8803E+13	-1.4310744	0.325
219	0.3	0.7	0.3	-12770855.22	7196444.262	5.17888E+13	-1.7746063	0.349
220	0.3	0.7	0.4	-14595244.44	7434215.741	5.52676E+13	-1.9632527	0.379
221	0.3	0.7	0.5	-15588711.42	7685716.777	5.90702E+13	-2.0282703	0.414
222	0.3	0.7	0.6	-15861029.12	7938727.532	6.30234E+13	-1.9979309	0.451
223	0.3	0.7	0.7	-15513903.47	8182260.586	6.69494E+13	-1.8960412	0.490
224	0.3	0.7	0.8	-14641310.88	8406504.699	7.06693E+13	-1.7416645	0.530
225	0.3	0.7	0.9	-13329829.25	8602769.625	7.40076E+13	-1.5494811	0.570
226	0.3	0.8	0.1	-6147813.32	6817476.382	4.6478E+13	-0.9017726	0.309
227	0.3	0.8	0.2	-9997359.87	6985911.911	4.8803E+13	-1.4310744	0.325
228	0.3	0.8	0.3	-12770855.22	7196444.262	5.17888E+13	-1.7746063	0.349
229	0.3	0.8	0.4	-14595244.44	7434215.741	5.52676E+13	-1.9632527	0.379
230	0.3	0.8	0.5	-15588711.42	7685716.777	5.90702E+13	-2.0282703	0.414
231	0.3	0.8	0.6	-15861029.12	7938727.532	6.30234E+13	-1.9979309	0.451
232	0.3	0.8	0.7	-15513903.47	8182260.586	6.69494E+13	-1.8960412	0.490
233	0.3	0.8	0.8	-14641310.88	8406504.699	7.06693E+13	-1.7416645	0.530
234	0.3	0.8	0.9	-13329829.25	8602769.625	7.40076E+13	-1.5494811	0.570
235	0.3	0.9	0.1	-6147813.32	6817476.382	4.6478E+13	-0.9017726	0.309
236	0.3	0.9	0.2	-9997359.87	6985911.911	4.8803E+13	-1.4310744	0.325
237	0.3	0.9	0.3	-12770855.22	7196444.262	5.17888E+13	-1.7746063	0.349
238	0.3	0.9	0.4	-14595244.44	7434215.741	5.52676E+13	-1.9632527	0.379
239	0.3	0.9	0.5	-15588711.42	7685716.777	5.90702E+13	-2.0282703	0.414
240	0.3	0.9	0.6	-15861029.12	7938727.532	6.30234E+13	-1.9979309	0.451
241	0.3	0.9	0.7	-15513903.47	8182260.586	6.69494E+13	-1.8960412	0.490
242	0.3	0.9	0.8	-14641310.88	8406504.699	7.06693E+13	-1.7416645	0.530
243	0.3	0.9	0.9	-13329829.25	8602769.625	7.40076E+13	-1.5494811	0.570
244	0.4	0.1	0.1	-6441956.702	6348180.636	4.02994E+13	-1.0147721	0.448
245	0.4	0.1	0.2	-9280339.614	6523443.436	4.25553E+13	-1.4226136	0.483
246	0.4	0.1	0.3	-10764535.56	6718468.175	4.51378E+13	-1.6022306	0.525
247	0.4	0.1	0.4	-11128970.21	6908009.825	4.77206E+13	-1.6110241	0.572

No	α	β	γ	CFE	MAD	MSE	Trk Signal	R-Square
248	0.4	0.1	0.5	-10584652.7	7070371.879	4.99902E+13	-1.4970433	0.621
249	0.4	0.1	0.6	-9320530.234	7187180.58	5.16556E+13	-1.2968271	0.670
250	0.4	0.1	0.7	-7504806.568	7377440.019	5.44266E+13	-1.0172643	0.718
251	0.4	0.1	0.8	-5286224.552	7661309.036	5.86957E+13	-0.6899897	0.763
252	0.4	0.1	0.9	-2795312.592	7849525.049	6.1615E+13	-0.3561123	0.806
253	0.4	0.2	0.1	-6441956.702	6348180.636	4.02994E+13	-1.0147721	0.448
254	0.4	0.2	0.2	-9280339.614	6523443.436	4.25553E+13	-1.4226136	0.483
255	0.4	0.2	0.3	-10764535.56	6718468.175	4.51378E+13	-1.6022306	0.525
256	0.4	0.2	0.4	-11128970.21	6908009.825	4.77206E+13	-1.6110241	0.572
257	0.4	0.2	0.5	-10584652.7	7070371.879	4.99902E+13	-1.4970433	0.621
258	0.4	0.2	0.6	-9320530.234	7187180.58	5.16556E+13	-1.2968271	0.670
259	0.4	0.2	0.7	-7504806.568	7377440.019	5.44266E+13	-1.0172643	0.718
260	0.4	0.2	0.8	-5286224.552	7661309.036	5.86957E+13	-0.6899897	0.763
261	0.4	0.2	0.9	-2795312.592	7849525.049	6.1615E+13	-0.3561123	0.806
262	0.4	0.3	0.1	-6441956.702	6348180.636	4.02994E+13	-1.0147721	0.448
263	0.4	0.3	0.2	-9280339.614	6523443.436	4.25553E+13	-1.4226136	0.483
264	0.4	0.3	0.3	-10764535.56	6718468.175	4.51378E+13	-1.6022306	0.525
265	0.4	0.3	0.4	-11128970.21	6908009.825	4.77206E+13	-1.6110241	0.572
266	0.4	0.3	0.5	-10584652.7	7070371.879	4.99902E+13	-1.4970433	0.621
267	0.4	0.3	0.6	-9320530.234	7187180.58	5.16556E+13	-1.2968271	0.670
268	0.4	0.3	0.7	-7504806.568	7377440.019	5.44266E+13	-1.0172643	0.718
269	0.4	0.3	0.8	-5286224.552	7661309.036	5.86957E+13	-0.6899897	0.763
270	0.4	0.3	0.9	-2795312.592	7849525.049	6.1615E+13	-0.3561123	0.806
271	0.4	0.4	0.1	-6441956.702	6348180.636	4.02994E+13	-1.0147721	0.448
272	0.4	0.4	0.2	-9280339.614	6523443.436	4.25553E+13	-1.4226136	0.483
273	0.4	0.4	0.3	-10764535.56	6718468.175	4.51378E+13	-1.6022306	0.525
274	0.4	0.4	0.4	-11128970.21	6908009.825	4.77206E+13	-1.6110241	0.572
275	0.4	0.4	0.5	-10584652.7	7070371.879	4.99902E+13	-1.4970433	0.621
276	0.4	0.4	0.6	-9320530.234	7187180.58	5.16556E+13	-1.2968271	0.670
277	0.4	0.4	0.7	-7504806.568	7377440.019	5.44266E+13	-1.0172643	0.718
278	0.4	0.4	0.8	-5286224.552	7661309.036	5.86957E+13	-0.6899897	0.763
279	0.4	0.4	0.9	-2795312.592	7849525.049	6.1615E+13	-0.3561123	0.806
280	0.4	0.5	0.1	-6441956.702	6348180.636	4.02994E+13	-1.0147721	0.448
281	0.4	0.5	0.2	-9280339.614	6523443.436	4.25553E+13	-1.4226136	0.483
282	0.4	0.5	0.3	-10764535.56	6718468.175	4.51378E+13	-1.6022306	0.525
283	0.4	0.5	0.4	-11128970.21	6908009.825	4.77206E+13	-1.6110241	0.572
284	0.4	0.5	0.5	-10584652.7	7070371.879	4.99902E+13	-1.4970433	0.621
285	0.4	0.5	0.6	-9320530.234	7187180.58	5.16556E+13	-1.2968271	0.670
286	0.4	0.5	0.7	-7504806.568	7377440.019	5.44266E+13	-1.0172643	0.718
287	0.4	0.5	0.8	-5286224.552	7661309.036	5.86957E+13	-0.6899897	0.763
288	0.4	0.5	0.9	-2795312.592	7849525.049	6.1615E+13	-0.3561123	0.806
289	0.4	0.6	0.1	-6441956.702	6348180.636	4.02994E+13	-1.0147721	0.448
290	0.4	0.6	0.2	-9280339.614	6523443.436	4.25553E+13	-1.4226136	0.483
291	0.4	0.6	0.3	-10764535.56	6718468.175	4.51378E+13	-1.6022306	0.525
292	0.4	0.6	0.4	-11128970.21	6908009.825	4.77206E+13	-1.6110241	0.572
293	0.4	0.6	0.5	-10584652.7	7070371.879	4.99902E+13	-1.4970433	0.621
294	0.4	0.6	0.6	-9320530.234	7187180.58	5.16556E+13	-1.2968271	0.670
295	0.4	0.6	0.7	-7504806.568	7377440.019	5.44266E+13	-1.0172643	0.718
296	0.4	0.6	0.8	-5286224.552	7661309.036	5.86957E+13	-0.6899897	0.763
297	0.4	0.6	0.9	-2795312.592	7849525.049	6.1615E+13	-0.3561123	0.806

No	α	β	γ	CFE	MAD	MSE	Trk Signal	R-Square
298	0.4	0.7	0.1	-6441956.702	6348180.636	4.02994E+13	-1.0147721	0.448
299	0.4	0.7	0.2	-9280339.614	6523443.436	4.25553E+13	-1.4226136	0.483
300	0.4	0.7	0.3	-10764535.56	6718468.175	4.51378E+13	-1.6022306	0.525
301	0.4	0.7	0.4	-11128970.21	6908009.825	4.77206E+13	-1.6110241	0.572
302	0.4	0.7	0.5	-10584652.7	7070371.879	4.99902E+13	-1.4970433	0.621
303	0.4	0.7	0.6	-9320530.234	7187180.58	5.16556E+13	-1.2968271	0.670
304	0.4	0.7	0.7	-7504806.568	7377440.019	5.44266E+13	-1.0172643	0.718
305	0.4	0.7	0.8	-5286224.552	7661309.036	5.86957E+13	-0.6899897	0.763
306	0.4	0.7	0.9	-2795312.592	7849525.049	6.1615E+13	-0.3561123	0.806
307	0.4	0.8	0.1	-6441956.702	6348180.636	4.02994E+13	-1.0147721	0.448
308	0.4	0.8	0.2	-9280339.614	6523443.436	4.25553E+13	-1.4226136	0.483
309	0.4	0.8	0.3	-10764535.56	6718468.175	4.51378E+13	-1.6022306	0.525
310	0.4	0.8	0.4	-11128970.21	6908009.825	4.77206E+13	-1.6110241	0.572
311	0.4	0.8	0.5	-10584652.7	7070371.879	4.99902E+13	-1.4970433	0.621
312	0.4	0.8	0.6	-9320530.234	7187180.58	5.16556E+13	-1.2968271	0.670
313	0.4	0.8	0.7	-7504806.568	7377440.019	5.44266E+13	-1.0172643	0.718
314	0.4	0.8	0.8	-5286224.552	7661309.036	5.86957E+13	-0.6899897	0.763
315	0.4	0.8	0.9	-2795312.592	7849525.049	6.1615E+13	-0.3561123	0.806
316	0.4	0.9	0.1	-6441956.702	6348180.636	4.02994E+13	-1.0147721	0.448
317	0.4	0.9	0.2	-9280339.614	6523443.436	4.25553E+13	-1.4226136	0.483
318	0.4	0.9	0.3	-10764535.56	6718468.175	4.51378E+13	-1.6022306	0.525
319	0.4	0.9	0.4	-11128970.21	6908009.825	4.77206E+13	-1.6110241	0.572
320	0.4	0.9	0.5	-10584652.7	7070371.879	4.99902E+13	-1.4970433	0.621
321	0.4	0.9	0.6	-9320530.234	7187180.58	5.16556E+13	-1.2968271	0.670
322	0.4	0.9	0.7	-7504806.568	7377440.019	5.44266E+13	-1.0172643	0.718
323	0.4	0.9	0.8	-5286224.552	7661309.036	5.86957E+13	-0.6899897	0.763
324	0.4	0.9	0.9	-2795312.592	7849525.049	6.1615E+13	-0.3561123	0.806
325	0.5	0.1	0.1	-5240969.653	5596023.457	3.13155E+13	-0.9365525	0.597
326	0.5	0.1	0.2	-6956892.259	5687575.077	3.23485E+13	-1.2231737	0.646
327	0.5	0.1	0.3	-7211920.553	5755308.434	3.31236E+13	-1.2530902	0.7
328	0.5	0.1	0.4	-6356028.253	5765736.227	3.32437E+13	-1.1023793	0.754
329	0.5	0.1	0.5	-4691521.635	5946912.037	3.53658E+13	-0.7889005	0.806
330	0.5	0.1	0.6	-2476802.247	6116444.486	3.74109E+13	-0.4049415	0.854
331	0.5	0.1	0.7	70007.80525	6148284.522	3.78014E+13	0.0113866	0.895
332	0.5	0.1	0.8	2767578.011	6033592.693	3.64042E+13	0.4586949	0.928
333	0.5	0.1	0.9	5468019.034	5878507.662	3.45569E+13	0.9301713	0.953
334	0.5	0.2	0.1	-5240969.653	5596023.457	3.13155E+13	-0.9365525	0.597
335	0.5	0.2	0.2	-6956892.259	5687575.077	3.23485E+13	-1.2231737	0.646
336	0.5	0.2	0.3	-7211920.553	5755308.434	3.31236E+13	-1.2530902	0.7
337	0.5	0.2	0.4	-6356028.253	5765736.227	3.32437E+13	-1.1023793	0.754
338	0.5	0.2	0.5	-4691521.635	5946912.037	3.53658E+13	-0.7889005	0.806
339	0.5	0.2	0.6	-2476802.247	6116444.486	3.74109E+13	-0.4049415	0.854
340	0.5	0.2	0.7	70007.80525	6148284.522	3.78014E+13	0.0113866	0.895
341	0.5	0.2	0.8	2767578.011	6033592.693	3.64042E+13	0.4586949	0.928
342	0.5	0.2	0.9	5468019.034	5878507.662	3.45569E+13	0.9301713	0.953
343	0.5	0.3	0.1	-5240969.653	5596023.457	3.13155E+13	-0.9365525	0.597
344	0.5	0.3	0.2	-6956892.259	5687575.077	3.23485E+13	-1.2231737	0.646
345	0.5	0.3	0.3	-7211920.553	5755308.434	3.31236E+13	-1.2530902	0.7
346	0.5	0.3	0.4	-6356028.253	5765736.227	3.32437E+13	-1.1023793	0.754
347	0.5	0.3	0.5	-4691521.635	5946912.037	3.53658E+13	-0.7889005	0.806

No	α	β	γ	CFE	MAD	MSE	Trk Signal	R-Square
348	0.5	0.3	0.6	-2476802.247	6116444.486	3.74109E+13	-0.4049415	0.854
349	0.5	0.3	0.7	70007.80525	6148284.522	3.78014E+13	0.0113866	0.895
350	0.5	0.3	0.8	2767578.011	6033592.693	3.64042E+13	0.4586949	0.928
351	0.5	0.3	0.9	5468019.034	5878507.662	3.45569E+13	0.9301713	0.953
352	0.5	0.4	0.1	-5240969.653	5596023.457	3.13155E+13	-0.9365525	0.597
353	0.5	0.4	0.2	-6956892.259	5687575.077	3.23485E+13	-1.2231737	0.646
354	0.5	0.4	0.3	-7211920.553	5755308.434	3.31236E+13	-1.2530902	0.7
355	0.5	0.4	0.4	-6356028.253	5765736.227	3.32437E+13	-1.1023793	0.754
356	0.5	0.4	0.5	-4691521.635	5946912.037	3.53658E+13	-0.7889005	0.806
357	0.5	0.4	0.6	-2476802.247	6116444.486	3.74109E+13	-0.4049415	0.854
358	0.5	0.4	0.7	70007.80525	6148284.522	3.78014E+13	0.0113866	0.895
359	0.5	0.4	0.8	2767578.011	6033592.693	3.64042E+13	0.4586949	0.928
360	0.5	0.4	0.9	5468019.034	5878507.662	3.45569E+13	0.9301713	0.953
361	0.5	0.5	0.1	-5240969.653	5596023.457	3.13155E+13	-0.9365525	0.597
362	0.5	0.5	0.2	-6956892.259	5687575.077	3.23485E+13	-1.2231737	0.646
363	0.5	0.5	0.3	-7211920.553	5755308.434	3.31236E+13	-1.2530902	0.7
364	0.5	0.5	0.4	-6356028.253	5765736.227	3.32437E+13	-1.1023793	0.754
365	0.5	0.5	0.5	-4691521.635	5946912.037	3.53658E+13	-0.7889005	0.806
366	0.5	0.5	0.6	-2476802.247	6116444.486	3.74109E+13	-0.4049415	0.854
367	0.5	0.5	0.7	70007.80525	6148284.522	3.78014E+13	0.0113866	0.895
368	0.5	0.5	0.8	2767578.011	6033592.693	3.64042E+13	0.4586949	0.928
369	0.5	0.5	0.9	5468019.034	5878507.662	3.45569E+13	0.9301713	0.953
370	0.5	0.6	0.1	-5240969.653	5596023.457	3.13155E+13	-0.9365525	0.597
371	0.5	0.6	0.2	-6956892.259	5687575.077	3.23485E+13	-1.2231737	0.646
372	0.5	0.6	0.3	-7211920.553	5755308.434	3.31236E+13	-1.2530902	0.7
373	0.5	0.6	0.4	-6356028.253	5765736.227	3.32437E+13	-1.1023793	0.754
374	0.5	0.6	0.5	-4691521.635	5946912.037	3.53658E+13	-0.7889005	0.806
375	0.5	0.6	0.6	-2476802.247	6116444.486	3.74109E+13	-0.4049415	0.854
376	0.5	0.6	0.7	70007.80525	6148284.522	3.78014E+13	0.0113866	0.895
377	0.5	0.6	0.8	2767578.011	6033592.693	3.64042E+13	0.4586949	0.928
378	0.5	0.6	0.9	5468019.034	5878507.662	3.45569E+13	0.9301713	0.953
379	0.5	0.7	0.1	-5240969.653	5596023.457	3.13155E+13	-0.9365525	0.597
380	0.5	0.7	0.2	-6956892.259	5687575.077	3.23485E+13	-1.2231737	0.646
381	0.5	0.7	0.3	-7211920.553	5755308.434	3.31236E+13	-1.2530902	0.7
382	0.5	0.7	0.4	-6356028.253	5765736.227	3.32437E+13	-1.1023793	0.754
383	0.5	0.7	0.5	-4691521.635	5946912.037	3.53658E+13	-0.7889005	0.806
384	0.5	0.7	0.6	-2476802.247	6116444.486	3.74109E+13	-0.4049415	0.854
385	0.5	0.7	0.7	70007.80525	6148284.522	3.78014E+13	0.0113866	0.895
386	0.5	0.7	0.8	2767578.011	6033592.693	3.64042E+13	0.4586949	0.928
387	0.5	0.7	0.9	5468019.034	5878507.662	3.45569E+13	0.9301713	0.953
388	0.5	0.8	0.1	-5240969.653	5596023.457	3.13155E+13	-0.9365525	0.597
389	0.5	0.8	0.2	-6956892.259	5687575.077	3.23485E+13	-1.2231737	0.646
390	0.5	0.8	0.3	-7211920.553	5755308.434	3.31236E+13	-1.2530902	0.7
391	0.5	0.8	0.4	-6356028.253	5765736.227	3.32437E+13	-1.1023793	0.754
392	0.5	0.8	0.5	-4691521.635	5946912.037	3.53658E+13	-0.7889005	0.806
393	0.5	0.8	0.6	-2476802.247	6116444.486	3.74109E+13	-0.4049415	0.854
394	0.5	0.8	0.7	70007.80525	6148284.522	3.78014E+13	0.0113866	0.895
395	0.5	0.8	0.8	2767578.011	6033592.693	3.64042E+13	0.4586949	0.928
396	0.5	0.8	0.9	5468019.034	5878507.662	3.45569E+13	0.9301713	0.953
397	0.5	0.9	0.1	-5240969.653	5596023.457	3.13155E+13	-0.9365525	0.597

No	α	β	γ	CFE	MAD	MSE	Trk Signal	R-Square
398	0.5	0.9	0.2	-6956892.259	5687575.077	3.23485E+13	-1.2231737	0.646
399	0.5	0.9	0.3	-7211920.553	5755308.434	3.31236E+13	-1.2530902	0.7
400	0.5	0.9	0.4	-6356028.253	5765736.227	3.32437E+13	-1.1023793	0.754
401	0.5	0.9	0.5	-4691521.635	5946912.037	3.53658E+13	-0.7889005	0.806
402	0.5	0.9	0.6	-2476802.247	6116444.486	3.74109E+13	-0.4049415	0.854
403	0.5	0.9	0.7	70007.80525	6148284.522	3.78014E+13	0.0113866	0.895
404	0.5	0.9	0.8	2767578.011	6033592.693	3.64042E+13	0.4586949	0.928
405	0.5	0.9	0.9	5468019.034	5878507.662	3.45569E+13	0.9301713	0.953
406	0.6	0.1	0.1	-3392523.69	4582608.548	2.10003E+13	-0.7403041	0.741
407	0.6	0.1	0.2	-4125348.807	4509543.029	2.0336E+13	-0.9148042	0.796
408	0.6	0.1	0.3	-3443315.258	4425022.56	1.95808E+13	-0.7781464	0.850
409	0.6	0.1	0.4	-1798959.084	4559092.825	2.07853E+13	-0.3945871	0.899
410	0.6	0.1	0.5	436254.2672	4525893.158	2.04837E+13	0.0963908	0.938
411	0.6	0.1	0.6	2963490.438	4333188.292	1.87765E+13	0.6839053	0.965
412	0.6	0.1	0.7	5548517.032	4907296.493	2.40816E+13	1.1306668	0.977
413	0.6	0.1	0.8	8014084.864	5448349.802	2.96845E+13	1.4709197	0.973
414	0.6	0.1	0.9	10232719.58	5951106.982	3.54157E+13	1.7194649	0.950
415	0.6	0.2	0.1	-3392523.69	4582608.548	2.10003E+13	-0.7403041	0.741
416	0.6	0.2	0.2	-4125348.807	4509543.029	2.0336E+13	-0.9148042	0.796
417	0.6	0.2	0.3	-3443315.258	4425022.56	1.95808E+13	-0.7781464	0.850
418	0.6	0.2	0.4	-1798959.084	4559092.825	2.07853E+13	-0.3945871	0.899
419	0.6	0.2	0.5	436254.2672	4525893.158	2.04837E+13	0.0963908	0.938
420	0.6	0.2	0.6	2963490.438	4333188.292	1.87765E+13	0.6839053	0.965
421	0.6	0.2	0.7	5548517.032	4907296.493	2.40816E+13	1.1306668	0.977
422	0.6	0.2	0.8	8014084.864	5448349.802	2.96845E+13	1.4709197	0.973
423	0.6	0.2	0.9	10232719.58	5951106.982	3.54157E+13	1.7194649	0.950
424	0.6	0.3	0.1	-3392523.69	4582608.548	2.10003E+13	-0.7403041	0.741
425	0.6	0.3	0.2	-4125348.807	4509543.029	2.0336E+13	-0.9148042	0.796
426	0.6	0.3	0.3	-3443315.258	4425022.56	1.95808E+13	-0.7781464	0.850
427	0.6	0.3	0.4	-1798959.084	4559092.825	2.07853E+13	-0.3945871	0.899
428	0.6	0.3	0.5	436254.2672	4525893.158	2.04837E+13	0.0963908	0.938
429	0.6	0.3	0.6	2963490.438	4333188.292	1.87765E+13	0.6839053	0.965
430	0.6	0.3	0.7	5548517.032	4907296.493	2.40816E+13	1.1306668	0.977
431	0.6	0.3	0.8	8014084.864	5448349.802	2.96845E+13	1.4709197	0.973
432	0.6	0.3	0.9	10232719.58	5951106.982	3.54157E+13	1.7194649	0.950
433	0.6	0.4	0.1	-3392523.69	4582608.548	2.10003E+13	-0.7403041	0.741
434	0.6	0.4	0.2	-4125348.807	4509543.029	2.0336E+13	-0.9148042	0.796
435	0.6	0.4	0.3	-3443315.258	4425022.56	1.95808E+13	-0.7781464	0.850
436	0.6	0.4	0.4	-1798959.084	4559092.825	2.07853E+13	-0.3945871	0.899
437	0.6	0.4	0.5	436254.2672	4525893.158	2.04837E+13	0.0963908	0.938
438	0.6	0.4	0.6	2963490.438	4333188.292	1.87765E+13	0.6839053	0.965
439	0.6	0.4	0.7	5548517.032	4907296.493	2.40816E+13	1.1306668	0.977
440	0.6	0.4	0.8	8014084.864	5448349.802	2.96845E+13	1.4709197	0.973
441	0.6	0.4	0.9	10232719.58	5951106.982	3.54157E+13	1.7194649	0.950
442	0.6	0.5	0.1	-3392523.69	4582608.548	2.10003E+13	-0.7403041	0.741
443	0.6	0.5	0.2	-4125348.807	4509543.029	2.0336E+13	-0.9148042	0.796
444	0.6	0.5	0.3	-3443315.258	4425022.56	1.95808E+13	-0.7781464	0.850
445	0.6	0.5	0.4	-1798959.084	4559092.825	2.07853E+13	-0.3945871	0.899
446	0.6	0.5	0.5	436254.2672	4525893.158	2.04837E+13	0.0963908	0.938
447	0.6	0.5	0.6	2963490.438	4333188.292	1.87765E+13	0.6839053	0.965

No	α	β	γ	CFE	MAD	MSE	Trk Signal	R-Square
448	0.6	0.5	0.7	5548517.032	4907296.493	2.40816E+13	1.1306668	0.977
449	0.6	0.5	0.8	8014084.864	5448349.802	2.96845E+13	1.4709197	0.973
450	0.6	0.5	0.9	10232719.58	5951106.982	3.54157E+13	1.7194649	0.950
451	0.6	0.6	0.1	-3392523.69	4582608.548	2.10003E+13	-0.7403041	0.741
452	0.6	0.6	0.2	-4125348.807	4509543.029	2.0336E+13	-0.9148042	0.796
453	0.6	0.6	0.3	-3443315.258	4425022.56	1.95808E+13	-0.7781464	0.850
454	0.6	0.6	0.4	-1798959.084	4559092.825	2.07853E+13	-0.3945871	0.899
455	0.6	0.6	0.5	436254.2672	4525893.158	2.04837E+13	0.0963908	0.938
456	0.6	0.6	0.6	2963490.438	4333188.292	1.87765E+13	0.6839053	0.965
457	0.6	0.6	0.7	5548517.032	4907296.493	2.40816E+13	1.1306668	0.977
458	0.6	0.6	0.8	8014084.864	5448349.802	2.96845E+13	1.4709197	0.973
459	0.6	0.6	0.9	10232719.58	5951106.982	3.54157E+13	1.7194649	0.950
460	0.6	0.7	0.1	-3392523.69	4582608.548	2.10003E+13	-0.7403041	0.741
461	0.6	0.7	0.2	-4125348.807	4509543.029	2.0336E+13	-0.9148042	0.796
462	0.6	0.7	0.3	-3443315.258	4425022.56	1.95808E+13	-0.7781464	0.850
463	0.6	0.7	0.4	-1798959.084	4559092.825	2.07853E+13	-0.3945871	0.899
464	0.6	0.7	0.5	436254.2672	4525893.158	2.04837E+13	0.0963908	0.938
465	0.6	0.7	0.6	2963490.438	4333188.292	1.87765E+13	0.6839053	0.965
466	0.6	0.7	0.7	5548517.032	4907296.493	2.40816E+13	1.1306668	0.977
467	0.6	0.7	0.8	8014084.864	5448349.802	2.96845E+13	1.4709197	0.973
468	0.6	0.7	0.9	10232719.58	5951106.982	3.54157E+13	1.7194649	0.950
469	0.6	0.8	0.1	-3392523.69	4582608.548	2.10003E+13	-0.7403041	0.741
470	0.6	0.8	0.2	-4125348.807	4509543.029	2.0336E+13	-0.9148042	0.796
471	0.6	0.8	0.3	-3443315.258	4425022.56	1.95808E+13	-0.7781464	0.850
472	0.6	0.8	0.4	-1798959.084	4559092.825	2.07853E+13	-0.3945871	0.899
473	0.6	0.8	0.5	436254.2672	4525893.158	2.04837E+13	0.0963908	0.938
474	0.6	0.8	0.6	2963490.438	4333188.292	1.87765E+13	0.6839053	0.965
475	0.6	0.8	0.7	5548517.032	4907296.493	2.40816E+13	1.1306668	0.977
476	0.6	0.8	0.8	8014084.864	5448349.802	2.96845E+13	1.4709197	0.973
477	0.6	0.8	0.9	10232719.58	5951106.982	3.54157E+13	1.7194649	0.950
478	0.6	0.9	0.1	-3392523.69	4582608.548	2.10003E+13	-0.7403041	0.741
479	0.6	0.9	0.2	-4125348.807	4509543.029	2.0336E+13	-0.9148042	0.796
480	0.6	0.9	0.3	-3443315.258	4425022.56	1.95808E+13	-0.7781464	0.850
481	0.6	0.9	0.4	-1798959.084	4559092.825	2.07853E+13	-0.3945871	0.899
482	0.6	0.9	0.5	436254.2672	4525893.158	2.04837E+13	0.0963908	0.938
483	0.6	0.9	0.6	2963490.438	4333188.292	1.87765E+13	0.6839053	0.965
484	0.6	0.9	0.7	5548517.032	4907296.493	2.40816E+13	1.1306668	0.977
485	0.6	0.9	0.8	8014084.864	5448349.802	2.96845E+13	1.4709197	0.973
486	0.6	0.9	0.9	10232719.58	5951106.982	3.54157E+13	1.7194649	0.950
487	0.7	0.1	0.1	-1399614.595	3366726.217	1.13348E+13	-0.4157198	0.865
488	0.7	0.1	0.2	-1388200.583	3141613.483	9.86974E+12	-0.441875	0.914
489	0.7	0.1	0.3	-114495.8309	3149414.213	9.91881E+12	-0.0363546	0.954
490	0.7	0.1	0.4	1896197.616	3085897.098	9.52276E+12	0.6144721	0.979
491	0.7	0.1	0.5	4239421.104	3662880.854	1.34167E+13	1.1574008	0.986
492	0.7	0.1	0.6	6615313.989	4339246.588	1.88291E+13	1.5245306	0.970
493	0.7	0.1	0.7	8813403.062	4847227.447	2.34956E+13	1.8182359	0.932
494	0.7	0.1	0.8	10698426.79	5281783.612	2.78972E+13	2.025533	0.970
495	0.7	0.1	0.9	12197194.38	5929646.708	3.51607E+13	2.056985	0.790
496	0.7	0.2	0.1	-1399614.595	3366726.217	1.13348E+13	-0.4157198	0.865
497	0.7	0.2	0.2	-1388200.583	3141613.483	9.86974E+12	-0.441875	0.914

No	α	β	γ	CFE	MAD	MSE	Trk Signal	R-Square
498	0.7	0.2	0.3	-114495.8309	3149414.213	9.91881E+12	-0.0363546	0.954
499	0.7	0.2	0.4	1896197.616	3085897.098	9.52276E+12	0.6144721	0.979
500	0.7	0.2	0.5	4239421.104	3662880.854	1.34167E+13	1.1574008	0.986
501	0.7	0.2	0.6	6615313.989	4339246.588	1.88291E+13	1.5245306	0.970
502	0.7	0.2	0.7	8813403.062	4847227.447	2.34956E+13	1.8182359	0.932
503	0.7	0.2	0.8	10698426.79	5281783.612	2.78972E+13	2.025533	0.970
504	0.7	0.2	0.9	12197194.38	5929646.708	3.51607E+13	2.056985	0.790
505	0.7	0.3	0.1	-1399614.595	3366726.217	1.13348E+13	-0.4157198	0.865
506	0.7	0.3	0.2	-1388200.583	3141613.483	9.86974E+12	-0.441875	0.914
507	0.7	0.3	0.3	-114495.8309	3149414.213	9.91881E+12	-0.0363546	0.954
508	0.7	0.3	0.4	1896197.616	3085897.098	9.52276E+12	0.6144721	0.979
509	0.7	0.3	0.5	4239421.104	3662880.854	1.34167E+13	1.1574008	0.986
510	0.7	0.3	0.6	6615313.989	4339246.588	1.88291E+13	1.5245306	0.970
511	0.7	0.3	0.7	8813403.062	4847227.447	2.34956E+13	1.8182359	0.932
512	0.7	0.3	0.8	10698426.79	5281783.612	2.78972E+13	2.025533	0.970
513	0.7	0.3	0.9	12197194.38	5929646.708	3.51607E+13	2.056985	0.790
514	0.7	0.4	0.1	-1399614.595	3366726.217	1.13348E+13	-0.4157198	0.865
515	0.7	0.4	0.2	-1388200.583	3141613.483	9.86974E+12	-0.441875	0.914
516	0.7	0.4	0.3	-114495.8309	3149414.213	9.91881E+12	-0.0363546	0.954
517	0.7	0.4	0.4	1896197.616	3085897.098	9.52276E+12	0.6144721	0.979
518	0.7	0.4	0.5	4239421.104	3662880.854	1.34167E+13	1.1574008	0.986
519	0.7	0.4	0.6	6615313.989	4339246.588	1.88291E+13	1.5245306	0.970
520	0.7	0.4	0.7	8813403.062	4847227.447	2.34956E+13	1.8182359	0.932
521	0.7	0.4	0.8	10698426.79	5281783.612	2.78972E+13	2.025533	0.970
522	0.7	0.4	0.9	12197194.38	5929646.708	3.51607E+13	2.056985	0.790
523	0.7	0.5	0.1	-1399614.595	3366726.217	1.13348E+13	-0.4157198	0.865
524	0.7	0.5	0.2	-1388200.583	3141613.483	9.86974E+12	-0.441875	0.914
525	0.7	0.5	0.3	-114495.8309	3149414.213	9.91881E+12	-0.0363546	0.954
526	0.7	0.5	0.4	1896197.616	3085897.098	9.52276E+12	0.6144721	0.979
527	0.7	0.5	0.5	4239421.104	3662880.854	1.34167E+13	1.1574008	0.986
528	0.7	0.5	0.6	6615313.989	4339246.588	1.88291E+13	1.5245306	0.970
529	0.7	0.5	0.7	8813403.062	4847227.447	2.34956E+13	1.8182359	0.932
530	0.7	0.5	0.8	10698426.79	5281783.612	2.78972E+13	2.025533	0.970
531	0.7	0.5	0.9	12197194.38	5929646.708	3.51607E+13	2.056985	0.790
532	0.7	0.6	0.1	-1399614.595	3366726.217	1.13348E+13	-0.4157198	0.865
533	0.7	0.6	0.2	-1388200.583	3141613.483	9.86974E+12	-0.441875	0.914
534	0.7	0.6	0.3	-114495.8309	3149414.213	9.91881E+12	-0.0363546	0.954
535	0.7	0.6	0.4	1896197.616	3085897.098	9.52276E+12	0.6144721	0.979
536	0.7	0.6	0.5	4239421.104	3662880.854	1.34167E+13	1.1574008	0.986
537	0.7	0.6	0.6	6615313.989	4339246.588	1.88291E+13	1.5245306	0.970
538	0.7	0.6	0.7	8813403.062	4847227.447	2.34956E+13	1.8182359	0.932
539	0.7	0.6	0.8	10698426.79	5281783.612	2.78972E+13	2.025533	0.970
540	0.7	0.6	0.9	12197194.38	5929646.708	3.51607E+13	2.056985	0.790
541	0.7	0.7	0.1	-1399614.595	3366726.217	1.13348E+13	-0.4157198	0.865
542	0.7	0.7	0.2	-1388200.583	3141613.483	9.86974E+12	-0.441875	0.914
543	0.7	0.7	0.3	-114495.8309	3149414.213	9.91881E+12	-0.0363546	0.954
544	0.7	0.7	0.4	1896197.616	3085897.098	9.52276E+12	0.6144721	0.979
545	0.7	0.7	0.5	4239421.104	3662880.854	1.34167E+13	1.1574008	0.986
546	0.7	0.7	0.6	6615313.989	4339246.588	1.88291E+13	1.5245306	0.970
547	0.7	0.7	0.7	8813403.062	4847227.447	2.34956E+13	1.8182359	0.932

No	α	β	γ	CFE	MAD	MSE	Trk Signal	R-Square
548	0.7	0.7	0.8	10698426.79	5281783.612	2.78972E+13	2.025533	0.970
549	0.7	0.7	0.9	12197194.38	5929646.708	3.51607E+13	2.056985	0.790
550	0.7	0.8	0.1	-1399614.595	3366726.217	1.13348E+13	-0.4157198	0.865
551	0.7	0.8	0.2	-1388200.583	3141613.483	9.86974E+12	-0.441875	0.914
552	0.7	0.8	0.3	-114495.8309	3149414.213	9.91881E+12	-0.0363546	0.954
553	0.7	0.8	0.4	1896197.616	3085897.098	9.52276E+12	0.6144721	0.979
554	0.7	0.8	0.5	4239421.104	3662880.854	1.34167E+13	1.1574008	0.986
555	0.7	0.8	0.6	6615313.989	4339246.588	1.88291E+13	1.5245306	0.970
556	0.7	0.8	0.7	8813403.062	4847227.447	2.34956E+13	1.8182359	0.932
557	0.7	0.8	0.8	10698426.79	5281783.612	2.78972E+13	2.025533	0.970
558	0.7	0.8	0.9	12197194.38	5929646.708	3.51607E+13	2.056985	0.790
559	0.7	0.9	0.1	-1399614.595	3366726.217	1.13348E+13	-0.4157198	0.865
560	0.7	0.9	0.2	-1388200.583	3141613.483	9.86974E+12	-0.441875	0.914
561	0.7	0.9	0.3	-114495.8309	3149414.213	9.91881E+12	-0.0363546	0.954
562	0.7	0.9	0.4	1896197.616	3085897.098	9.52276E+12	0.6144721	0.979
563	0.7	0.9	0.5	4239421.104	3662880.854	1.34167E+13	1.1574008	0.986
564	0.7	0.9	0.6	6615313.989	4339246.588	1.88291E+13	1.5245306	0.970
565	0.7	0.9	0.7	8813403.062	4847227.447	2.34956E+13	1.8182359	0.932
566	0.7	0.9	0.8	10698426.79	5281783.612	2.78972E+13	2.025533	0.970
567	0.7	0.9	0.9	12197194.38	5929646.708	3.51607E+13	2.056985	0.790
568	0.8	0.1	0.1	482920.5251	2028267.199	4.11387E+12	0.2380951	0.954
569	0.8	0.1	0.2	996997.3102	1877302.379	3.52426E+12	0.5310798	0.984
570	0.8	0.1	0.3	2568637.301	2302979.12	5.30371E+12	1.1153541	0.993
571	0.8	0.1	0.4	4638847.175	3033427.598	9.20168E+12	1.5292428	0.977
572	0.8	0.1	0.5	6810818.122	3634380.436	1.32087E+13	1.873997	0.935
573	0.8	0.1	0.6	8822143.768	4134175.891	1.70914E+13	2.1339546	0.865
574	0.8	0.1	0.7	10519343.86	5284204.897	2.79228E+13	1.9907146	0.774
575	0.8	0.1	0.8	11834693.67	6391832.845	4.08555E+13	1.8515337	0.667
576	0.8	0.1	0.9	12765359.23	7390585.769	5.46208E+13	1.7272459	0.553
577	0.8	0.2	0.1	482920.5251	2028267.199	4.11387E+12	0.2380951	0.954
578	0.8	0.2	0.2	996997.3102	1877302.379	3.52426E+12	0.5310798	0.984
579	0.8	0.2	0.3	2568637.301	2302979.12	5.30371E+12	1.1153541	0.993
580	0.8	0.2	0.4	4638847.175	3033427.598	9.20168E+12	1.5292428	0.977
581	0.8	0.2	0.5	6810818.122	3634380.436	1.32087E+13	1.873997	0.935
582	0.8	0.2	0.6	8822143.768	4134175.891	1.70914E+13	2.1339546	0.865
583	0.8	0.2	0.7	10519343.86	5284204.897	2.79228E+13	1.9907146	0.774
584	0.8	0.2	0.8	11834693.67	6391832.845	4.08555E+13	1.8515337	0.667
585	0.8	0.2	0.9	12765359.23	7390585.769	5.46208E+13	1.7272459	0.553
586	0.8	0.3	0.1	482920.5251	2028267.199	4.11387E+12	0.2380951	0.954
587	0.8	0.3	0.2	996997.3102	1877302.379	3.52426E+12	0.5310798	0.984
588	0.8	0.3	0.3	2568637.301	2302979.12	5.30371E+12	1.1153541	0.993
589	0.8	0.3	0.4	4638847.175	3033427.598	9.20168E+12	1.5292428	0.977
590	0.8	0.3	0.5	6810818.122	3634380.436	1.32087E+13	1.873997	0.935
591	0.8	0.3	0.6	8822143.768	4134175.891	1.70914E+13	2.1339546	0.865
592	0.8	0.3	0.7	10519343.86	5284204.897	2.79228E+13	1.9907146	0.774
593	0.8	0.3	0.8	11834693.67	6391832.845	4.08555E+13	1.8515337	0.667
594	0.8	0.3	0.9	12765359.23	7390585.769	5.46208E+13	1.7272459	0.553
595	0.8	0.4	0.1	482920.5251	2028267.199	4.11387E+12	0.2380951	0.954
596	0.8	0.4	0.2	996997.3102	1877302.379	3.52426E+12	0.5310798	0.984
597	0.8	0.4	0.3	2568637.301	2302979.12	5.30371E+12	1.1153541	0.993

No	α	β	γ	CFE	MAD	MSE	Trk Signal	R-Square
598	0.8	0.4	0.4	4638847.175	3033427.598	9.20168E+12	1.5292428	0.977
599	0.8	0.4	0.5	6810818.122	3634380.436	1.32087E+13	1.873997	0.935
600	0.8	0.4	0.6	8822143.768	4134175.891	1.70914E+13	2.1339546	0.865
601	0.8	0.4	0.7	10519343.86	5284204.897	2.79228E+13	1.9907146	0.774
602	0.8	0.4	0.8	11834693.67	6391832.845	4.08555E+13	1.8515337	0.667
603	0.8	0.4	0.9	12765359.23	7390585.769	5.46208E+13	1.7272459	0.553
604	0.8	0.5	0.1	482920.5251	2028267.199	4.11387E+12	0.2380951	0.954
605	0.8	0.5	0.2	996997.3102	1877302.379	3.52426E+12	0.5310798	0.984
606	0.8	0.5	0.3	2568637.301	2302979.12	5.30371E+12	1.1153541	0.993
607	0.8	0.5	0.4	4638847.175	3033427.598	9.20168E+12	1.5292428	0.977
608	0.8	0.5	0.5	6810818.122	3634380.436	1.32087E+13	1.873997	0.935
609	0.8	0.5	0.6	8822143.768	4134175.891	1.70914E+13	2.1339546	0.865
610	0.8	0.5	0.7	10519343.86	5284204.897	2.79228E+13	1.9907146	0.774
611	0.8	0.5	0.8	11834693.67	6391832.845	4.08555E+13	1.8515337	0.667
612	0.8	0.5	0.9	12765359.23	7390585.769	5.46208E+13	1.7272459	0.553
613	0.8	0.6	0.1	482920.5251	2028267.199	4.11387E+12	0.2380951	0.954
614	0.8	0.6	0.2	996997.3102	1877302.379	3.52426E+12	0.5310798	0.984
615	0.8	0.6	0.3	2568637.301	2302979.12	5.30371E+12	1.1153541	0.993
616	0.8	0.6	0.4	4638847.175	3033427.598	9.20168E+12	1.5292428	0.977
617	0.8	0.6	0.5	6810818.122	3634380.436	1.32087E+13	1.873997	0.935
618	0.8	0.6	0.6	8822143.768	4134175.891	1.70914E+13	2.1339546	0.865
619	0.8	0.6	0.7	10519343.86	5284204.897	2.79228E+13	1.9907146	0.774
620	0.8	0.6	0.8	11834693.67	6391832.845	4.08555E+13	1.8515337	0.667
621	0.8	0.6	0.9	12765359.23	7390585.769	5.46208E+13	1.7272459	0.553
622	0.8	0.7	0.1	482920.5251	2028267.199	4.11387E+12	0.2380951	0.954
623	0.8	0.7	0.2	996997.3102	1877302.379	3.52426E+12	0.5310798	0.984
624	0.8	0.7	0.3	2568637.301	2302979.12	5.30371E+12	1.1153541	0.993
625	0.8	0.7	0.4	4638847.175	3033427.598	9.20168E+12	1.5292428	0.977
626	0.8	0.7	0.5	6810818.122	3634380.436	1.32087E+13	1.873997	0.935
627	0.8	0.7	0.6	8822143.768	4134175.891	1.70914E+13	2.1339546	0.865
628	0.8	0.7	0.7	10519343.86	5284204.897	2.79228E+13	1.9907146	0.774
629	0.8	0.7	0.8	11834693.67	6391832.845	4.08555E+13	1.8515337	0.667
630	0.8	0.7	0.9	12765359.23	7390585.769	5.46208E+13	1.7272459	0.553
631	0.8	0.8	0.1	482920.5251	2028267.199	4.11387E+12	0.2380951	0.954
632	0.8	0.8	0.2	996997.3102	1877302.379	3.52426E+12	0.5310798	0.984
633	0.8	0.8	0.3	2568637.301	2302979.12	5.30371E+12	1.1153541	0.993
634	0.8	0.8	0.4	4638847.175	3033427.598	9.20168E+12	1.5292428	0.977
635	0.8	0.8	0.5	6810818.122	3634380.436	1.32087E+13	1.873997	0.935
636	0.8	0.8	0.6	8822143.768	4134175.891	1.70914E+13	2.1339546	0.865
637	0.8	0.8	0.7	10519343.86	5284204.897	2.79228E+13	1.9907146	0.774
638	0.8	0.8	0.8	11834693.67	6391832.845	4.08555E+13	1.8515337	0.667
639	0.8	0.8	0.9	12765359.23	7390585.769	5.46208E+13	1.7272459	0.553
640	0.8	0.9	0.1	482920.5251	2028267.199	4.11387E+12	0.2380951	0.954
641	0.8	0.9	0.2	996997.3102	1877302.379	3.52426E+12	0.5310798	0.984
642	0.8	0.9	0.3	2568637.301	2302979.12	5.30371E+12	1.1153541	0.993
643	0.8	0.9	0.4	4638847.175	3033427.598	9.20168E+12	1.5292428	0.977
644	0.8	0.9	0.5	6810818.122	3634380.436	1.32087E+13	1.873997	0.935
645	0.8	0.9	0.6	8822143.768	4134175.891	1.70914E+13	2.1339546	0.865
646	0.8	0.9	0.7	10519343.86	5284204.897	2.79228E+13	1.9907146	0.774
647	0.8	0.9	0.8	11834693.67	6391832.845	4.08555E+13	1.8515337	0.667

No	α	β	γ	CFE	MAD	MSE	Trk Signal	R-Square
648	0.8	0.9	0.9	12765359.23	7390585.769	5.46208E+13	1.7272459	0.553
649	0.9	0.1	0.1	2167468.381	928430.3176	8.61983E+11	2.3345515	0.997
650	0.9	0.1	0.2	2992986.509	1550097.44	2.4028E+12	1.9308377	0.991
651	0.9	0.1	0.3	4667861.656	2287120.666	5.23092E+12	2.0409337	0.957
652	0.9	0.1	0.4	6639012.038	3121387.149	9.74306E+12	2.1269428	0.892
653	0.9	0.1	0.5	8552486.347	4171436.127	1.74009E+13	2.0502499	0.800
654	0.9	0.1	0.6	10210411.18	5246938.855	2.75304E+13	1.9459749	0.688
655	0.9	0.1	0.7	11532612.9	6225546.548	3.87574E+13	1.8524659	0.567
656	0.9	0.1	0.8	12522913.89	7650232.977	5.85261E+13	1.6369324	0.446
657	0.9	0.1	0.9	13240103.3	9011639.025	8.12096E+13	1.4692226	0.335
658	0.9	0.2	0.1	2167468.381	928430.3176	8.61983E+11	2.3345515	0.997
659	0.9	0.2	0.2	2992986.509	1550097.44	2.4028E+12	1.9308377	0.991
660	0.9	0.2	0.3	4667861.656	2287120.666	5.23092E+12	2.0409337	0.957
661	0.9	0.2	0.4	6639012.038	3121387.149	9.74306E+12	2.1269428	0.892
662	0.9	0.2	0.5	8552486.347	4171436.127	1.74009E+13	2.0502499	0.800
663	0.9	0.2	0.6	10210411.18	5246938.855	2.75304E+13	1.9459749	0.688
664	0.9	0.2	0.7	11532612.9	6225546.548	3.87574E+13	1.8524659	0.567
665	0.9	0.2	0.8	12522913.89	7650232.977	5.85261E+13	1.6369324	0.446
666	0.9	0.2	0.9	13240103.3	9011639.025	8.12096E+13	1.4692226	0.335
667	0.9	0.3	0.1	2167468.381	928430.3176	8.61983E+11	2.3345515	0.997
668	0.9	0.3	0.2	2992986.509	1550097.44	2.4028E+12	1.9308377	0.991
669	0.9	0.3	0.3	4667861.656	2287120.666	5.23092E+12	2.0409337	0.957
670	0.9	0.3	0.4	6639012.038	3121387.149	9.74306E+12	2.1269428	0.892
671	0.9	0.3	0.5	8552486.347	4171436.127	1.74009E+13	2.0502499	0.800
672	0.9	0.3	0.6	10210411.18	5246938.855	2.75304E+13	1.9459749	0.688
673	0.9	0.3	0.7	11532612.9	6225546.548	3.87574E+13	1.8524659	0.567
674	0.9	0.3	0.8	12522913.89	7650232.977	5.85261E+13	1.6369324	0.446
675	0.9	0.3	0.9	13240103.3	9011639.025	8.12096E+13	1.4692226	0.335
676	0.9	0.4	0.1	2167468.381	928430.3176	8.61983E+11	2.3345515	0.997
677	0.9	0.4	0.2	2992986.509	1550097.44	2.4028E+12	1.9308377	0.991
678	0.9	0.4	0.3	4667861.656	2287120.666	5.23092E+12	2.0409337	0.957
679	0.9	0.4	0.4	6639012.038	3121387.149	9.74306E+12	2.1269428	0.892
680	0.9	0.4	0.5	8552486.347	4171436.127	1.74009E+13	2.0502499	0.800
681	0.9	0.4	0.6	10210411.18	5246938.855	2.75304E+13	1.9459749	0.688
682	0.9	0.4	0.7	11532612.9	6225546.548	3.87574E+13	1.8524659	0.567
683	0.9	0.4	0.8	12522913.89	7650232.977	5.85261E+13	1.6369324	0.446
684	0.9	0.4	0.9	13240103.3	9011639.025	8.12096E+13	1.4692226	0.335
685	0.9	0.5	0.1	2167468.381	928430.3176	8.61983E+11	2.3345515	0.997
686	0.9	0.5	0.2	2992986.509	1550097.44	2.4028E+12	1.9308377	0.991
687	0.9	0.5	0.3	4667861.656	2287120.666	5.23092E+12	2.0409337	0.957
688	0.9	0.5	0.4	6639012.038	3121387.149	9.74306E+12	2.1269428	0.892
689	0.9	0.5	0.5	8552486.347	4171436.127	1.74009E+13	2.0502499	0.800
690	0.9	0.5	0.6	10210411.18	5246938.855	2.75304E+13	1.9459749	0.688
691	0.9	0.5	0.7	11532612.9	6225546.548	3.87574E+13	1.8524659	0.567
692	0.9	0.5	0.8	12522913.89	7650232.977	5.85261E+13	1.6369324	0.446
693	0.9	0.5	0.9	13240103.3	9011639.025	8.12096E+13	1.4692226	0.335
694	0.9	0.6	0.1	2167468.381	928430.3176	8.61983E+11	2.3345515	0.997
695	0.9	0.6	0.2	2992986.509	1550097.44	2.4028E+12	1.9308377	0.991
696	0.9	0.6	0.3	4667861.656	2287120.666	5.23092E+12	2.0409337	0.957
697	0.9	0.6	0.4	6639012.038	3121387.149	9.74306E+12	2.1269428	0.892

No	α	β	γ	CFE	MAD	MSE	Trk Signal	R-Square
698	0.9	0.6	0.5	8552486.347	4171436.127	1.74009E+13	2.0502499	0.800
699	0.9	0.6	0.6	10210411.18	5246938.855	2.75304E+13	1.9459749	0.688
700	0.9	0.6	0.7	11532612.9	6225546.548	3.87574E+13	1.8524659	0.567
701	0.9	0.6	0.8	12522913.89	7650232.977	5.85261E+13	1.6369324	0.446
702	0.9	0.6	0.9	13240103.3	9011639.025	8.12096E+13	1.4692226	0.335
703	0.9	0.7	0.1	2167468.381	928430.3176	8.61983E+11	2.3345515	0.997
704	0.9	0.7	0.2	2992986.509	1550097.44	2.4028E+12	1.9308377	0.991
705	0.9	0.7	0.3	4667861.656	2287120.666	5.23092E+12	2.0409337	0.957
706	0.9	0.7	0.4	6639012.038	3121387.149	9.74306E+12	2.1269428	0.892
707	0.9	0.7	0.5	8552486.347	4171436.127	1.74009E+13	2.0502499	0.800
708	0.9	0.7	0.6	10210411.18	5246938.855	2.75304E+13	1.9459749	0.688
709	0.9	0.7	0.7	11532612.9	6225546.548	3.87574E+13	1.8524659	0.567
710	0.9	0.7	0.8	12522913.89	7650232.977	5.85261E+13	1.6369324	0.446
711	0.9	0.7	0.9	13240103.3	9011639.025	8.12096E+13	1.4692226	0.335
712	0.9	0.8	0.1	2167468.381	928430.3176	8.61983E+11	2.3345515	0.997
713	0.9	0.8	0.2	2992986.509	1550097.44	2.4028E+12	1.9308377	0.991
714	0.9	0.8	0.3	4667861.656	2287120.666	5.23092E+12	2.0409337	0.957
715	0.9	0.8	0.4	6639012.038	3121387.149	9.74306E+12	2.1269428	0.892
716	0.9	0.8	0.5	8552486.347	4171436.127	1.74009E+13	2.0502499	0.800
717	0.9	0.8	0.6	10210411.18	5246938.855	2.75304E+13	1.9459749	0.688
718	0.9	0.8	0.7	11532612.9	6225546.548	3.87574E+13	1.8524659	0.567
719	0.9	0.8	0.8	12522913.89	7650232.977	5.85261E+13	1.6369324	0.446
720	0.9	0.8	0.9	13240103.3	9011639.025	8.12096E+13	1.4692226	0.335
721	0.9	0.9	0.1	2167468.381	928430.3176	8.61983E+11	2.3345515	0.997
722	0.9	0.9	0.2	2992986.509	1550097.44	2.4028E+12	1.9308377	0.991
723	0.9	0.9	0.3	4667861.656	2287120.666	5.23092E+12	2.0409337	0.957
724	0.9	0.9	0.4	6639012.038	3121387.149	9.74306E+12	2.1269428	0.892
725	0.9	0.9	0.5	8552486.347	4171436.127	1.74009E+13	2.0502499	0.800
726	0.9	0.9	0.6	10210411.18	5246938.855	2.75304E+13	1.9459749	0.688
727	0.9	0.9	0.7	11532612.9	6225546.548	3.87574E+13	1.8524659	0.567
728	0.9	0.9	0.8	12522913.89	7650232.977	5.85261E+13	1.6369324	0.446
729	0.9	0.9	0.9	13240103.3	9011639.025	8.12096E+13	1.4692226	0.335

4.2.2.2. Metode Kuadratik

Tabel 4.6. Metode Kuadratik $\alpha = 0,3$

Periode	Demand	Pemulusan tunggal	Pemulusan ganda	Pemulusan triple	nilai a	nilai b	nilai c	Ft	forecast error	CFE	MAD	MSE	Trk Signal
1	4.5E+07	45371625	45371625	45371625									
2	5E+07	46768888.5	45790804.05	45497378.72	48431632.1	1068906.58	125753.715						
3	6.9E+07	53488545.45	48100126.47	46278203.04	62443460	5693853.91	655070.612	49563416	19604330	19604330	19604330	3.84E+14	1
4	7.2E+07	59164840.82	51419540.77	47820604.36	71056504.5	7254228.77	761576.993	68464849	3944681	23549010	11774505	1.39E+14	2
5	5E+07	56358106.57	52901110.51	49344756.21	59715744.4	1387280.79	-18249.474	78691522	-2.9E+07	-5333451	17477157	3.05E+14	-0.305167
6	5.1E+07	54793051.1	53468692.69	50581937.15	54555012.4	-915100.81	-286970.901	61093900	-9952645	-15286097	15596029	2.43E+14	-0.9801275
7	5.2E+07	54011247.77	53631459.21	51496793.77	52636159.4	-1502575.8	-322324.326	53496426	-1309386	-16595483	12738701	1.62E+14	-1.302761
8	6E+07	55925678.94	54319725.13	52343673.18	57161534.6	337050.332	-67977.21	50972421	9420264	-7175219	12185628	1.48E+14	-0.5888264
9	6.5E+07	58737114.26	55644941.87	53334053.79	62610571	2066639.6	143501.199	57464596	7832534	657314.2	11563757	1.34E+14	0.05684262
10	4.6E+07	54829153.98	55400205.5	53953899.3	52240744.7	-2159167.7	-370535.092	64748961	-1.9E+07	-18381067	12498085	1.56E+14	-1.4707106
11	4.4E+07	51719384.29	54295959.14	54056517.25	46326792.7	-3776588.8	-517227.564	49896310	-5433055	-23814121	11713082	1.37E+14	-2.0331218
12	4.5E+07	49723558	52924238.8	53716833.72	44114791.3	-3656944.7	-442301.488	42291590	2775040	-21039082	10819278	1.17E+14	-1.9445921
13					55380607.2	1883167.57	-28063.461	40236696					
14					55380607.2	1883167.57	-28063.461	59090815					
15					55380607.2	1883167.57	-28063.461	60903824					
16					55380607.2	1883167.57	-28063.461	62688770					
17					55380607.2	1883167.57	-28063.461	64445652					
18					55380607.2	1883167.57	-28063.461	66174470					
19					55380607.2	1883167.57	-28063.461	67875225					
20					55380607.2	1883167.57	-28063.461	69547917					
21					55380607.2	1883167.57	-28063.461	71192545					
22					55380607.2	1883167.57	-28063.461	72809110					
23					55380607.2	1883167.57	-28063.461	74397611					
24					55380607.2	1883167.57	-28063.461	75958049					

Contoh perhitungan kuadratik:

Pemulusan pertama (S'_t) = α X_t + (1 – α) S'_{t-1}

S'_{12} = 0,3 X_{12} + (1 – 0,3) S'_{11}

= 0,3(45066630) + (1 – 0,3) 51719384.29

= 49723558

Pemulusan ganda (S''_t) = α S'_t + (1 – α) S''_{t-1}

S''_{12} = 0,3 S'_{12} + (1 – 0,3) S''_{11}

= 0,3(49723558) + (1 – 0,3) 54295959.14

= 52924238.8

Pemulusan tripel (S'''_t) = α S''_t + (1 – α) S'''_{t-1}

S'''_{12} = 0,3 S''_{12} + (1 – 0,3) S'''_{11}

= 0,3(52924238.8) + (1 – 0,3) 54056517.25

= 53716833.72

Nilai a (a_t) = 3S'_t - 3S''_t + S'''_t

a_{12} = 3S'_{12} - 3S''_{12} + S'''_{12}

=3(49723558) – 3(52924238.8) + 53716833.72

= 44114791.3

Nilai b (b_t) = $\frac{\alpha}{2(1-\alpha)^2}$ [(6 - 5α) S'_t - (10 - 8α) S''_t + (4 – 3α) S'''_t]

b_{12} = $\frac{0,3}{2(1-0,3)^2}$ [(6 – 5(0,3)) S'_{12} - (10 – 8(0,3)) S''_{12} + (4 – 3(0,3)) S'''_{12}]

= -3656944.7

Nilai c (c_t) $= \frac{\alpha^2}{(1-\alpha)^2}$ $(S_t' - 2S_t'' + S_t''')$

c_{12} $= \frac{0{,}3^2}{(1-0{,}3)^2}$ $(S_{12}' - 2S_{12}'' + S_{12}''')$

$= \frac{0{,}3^2}{(1-0{,}3)^2}$ [49723558 – 2(52924238.8) + 53716833.72]

= -442301.488

Ramalan (F_{t+m}) $= a_t + b_t m + \frac{1}{2} c_t m^2$

F_{13} $= a_{12} + b_{12}(1) + \frac{1}{2} c_{12}(1^2)$

$= 44114791.3 + -3656944.7\ (1) + \frac{1}{2}$ -442301.488(1^2)

= 40236696

Tabel 4.13. Hasil perhitungan Metode Kuadratik dengan Trial Error

No	α	CFE	MAD	MSE	Trk Signal	R- Square
1	0.1	-10504516.99	11329480	1.28E+14	-0.92718437	0.371
2	0.2	-27268460.83	11355837.23	1.29E+14	-2.401272604	0.019
3	0.3	-21039081.58	10819277.64	1.17E+14	-1.944592078	0.008
4	0.4	-13284541.01	11205146.47	1.26E+14	-1.185574954	0.049
5	0.5	-7372765.99	13096441.58	1.72E+14	-0.562959483	0.111
6	0.6	-2743346.37	15298282.56	2.34E+14	-0.179323814	0.189
7	0.7	692913.34	16824592.54	2.83E+14	0.041184554	0.265
8	0.8	2254254.34	16944077.3	2.87E+14	0.133040844	0.315
9	0.9	1203701.2	15886269.14	2.52E+14	0.075769911	0.321

4.2.2.3. Metode Regresi Linear

Tabel 4.14. Hasil perhitungan Metode Regresi Linear

06-10-2011 Month	Actual Data	Forecast by LR	Forecast Error	CFE	MAD	MSE	MAPE (%)	Tracking Signal	R-sqaure
1	45371620.0000	58492500.0000	-13120880.0000	-13120880.0000	13120880.0000	172157500000000.0000	28.9187	-1.0000	1.0000
2	50029170.0000	57721830.0000	-7692660.0000	-20813540.0000	10406770.0000	115667300000000.0000	22.1475	-2.0000	1.0000
3	69167740.0000	56951160.0000	12216580.0000	-8596960.0000	11010040.0000	126859800000000.0000	20.6524	-0.7808	0.0812
4	72409530.0000	56180480.0000	16229040.0000	7632084.0000	12314790.0000	160990300000000.0000	21.0925	0.6197	0.0319
5	49809060.0000	55409810.0000	-5600752.0000	2031332.0000	10971990.0000	135066000000000.0000	19.1229	0.1851	0.0109
6	51141260.0000	54639140.0000	-3497884.0000	-1466552.0000	9726301.0000	114594200000000.0000	17.0757	-0.1508	0.0165
7	52107040.0000	53868470.0000	-1601420.0000	-3147900.0000	0577034.0000	90627460000000.0000	15.0966	-0.3670	0.0270
8	60392680.0000	53097800.0000	7294868.0000	4146908.0000	8416766.0000	92950950000000.0000	14.7194	0.4927	0.0395
9	65297130.0000	52327120.0000	12970000.0000	17116910.0000	8922681.0000	101314300000000.0000	15.2909	1.9184	0.0900
10	45710580.0000	51556450.0000	-5845868.0000	11271040.0000	8615000.0000	94600280000000.0000	15.0407	1.3083	0.0702
11	44463260.0000	50785780.0000	-6322520.0000	4948524.0000	8406593.0000	89634280000000.0000	14.9661	0.5886	0.0673
12	45066630.0000	50015100.0000	-4948472.0000	52.0000	8118416.0000	84205370000000.0000	14.6339	0.0000	0.0775
13		49244430.0000							
14		48473760.0000							
15		47703090.0000							
16		46932420.0000							
17		46161740.0000							
18		45391070.0000							
19		44620400.0000							
20		43849720.0000							
21		43079050.0000							
22		42308380.0000							
23		41537700.0000							
24		40767030.0000							
CFE		52.0000							
MAD		8118416.0000							
MSE		84205370000000.0000							
MAPE		14.6339							
Trk.Signal		0.0000							
R-sqaure		0.0775							
		a=5.93E7							
		b=-770672.600							

Tabel 4.15. Perbandingan MSE Terkecil dari setiap Metode

Metode	α	β	γ	MSE	Trk Signal	R- Square
Winter	0,9	0,1	0,1	8.61983E+11	2.3345515	0.997
Kuadratik	0,3			1.17E+14	-1.944592078	0.008
Regresi linear				8.42E+13	0	0.0775

Dari tabel 4.16. dapat dilihat bahwa metode yang terpilih yaitu Metode Winter karena memiliki nilai MSE terkecil dengan nilai 8.61983E+11, Tracking Signal bernilai 2.3345515 berada diantara ± 4 dan R-Square 99.7%. yang berarti bahwa waktu mempengaruhi 99.7% terhadap estimasi jumlah polyster. Hasil peramalan akan dilanjutkan untuk perhitungan Rencana Produksi Agregat dan Disagregasi.

Tabel 4.16. Hasil Peramalan Dari Metode Terpilih

Periode	Nilai Aktual	Hasil peramalan/seribu rupiah
13	-	39392569
14	-	42776607
15	-	58122175
16	-	59858352
17	-	40916621
18	-	41289426
19	-	39392569
20	-	42776607
21	-	58122175
22	-	59858352
23	-	40916621
24	-	41289426

4.2.3. Rencana Produksi Agregat

Setelah dipilih teknik peramalan yang akan digunakan dalam penyusunan jadwal produksi, maka langkah selanjutnya dalam perencanaan produksi adalah menentukan rencana produksi agregat. Dalam tugas akhir ini rencana produksi agregat hanya berperan untuk menghitung jumlah yang harus diproduksi untuk menyusun jadwal induk produksi, sehingga tidak dilakukan tahap optimalisasi biaya.

Pada penelitian ini digunakan asumsi strategi chase demand untuk menyusun rencana produksi agregat. Strategi chase demand berasal dari pendekatan charting yaitu menyamakan jumlah produksi dengan tingkat permintaan yang ada dengan perubahan level produksi ataupun kapasitas produksi. Dengan pendekatan charting walaupun permintaan berfluktuasi, produksi dapat dibuat dalam tingkatan jumlah produksi tertentu atau dibuat mengikuti pola permintaan yang ada dengan berbagai cara.

Pada strategi chase demand berupa menyamakan jumlah produksi dengan hasil peramalan. Dengan demikian jumlah produksi tiap periode dari periode 13 sampai 24 yaitu:

Tabel 4.17. Unit Agregat

Periode	Unit Agregat/seribu rupiah
13	39392569
14	42776607
15	58122175
16	59858352
17	40916621
18	41289426
19	39392569
20	42776607
21	58122175
22	59858352
23	40916621
24	41289426

4.2.4. Disagregasi

Dari rencana produksi agregat yang sama dengan hasil peramalan, didapatkan rencana produksi di periode yang akan datang. Namun rencana produksi agregat masih dalam bentuk satuan unit agregat. Oleh karena itu diperlukan proses disagregasi.

Disagregasi yaitu pengembalian rencana produksi agregat dalam masing – masing unit item, dengan menggunakan teknik tertentu. Metode disagregasi yang digunakan dalam penelitian ini adalah metode *family set up* karena berdasarkan harga proporsi masing – masing item.

Tabel 4.18. Disagregasi hasil peramalan

Periode	Per seribu rupiah		
	Unit Agregat	Printing (55.07338562%)	Dyeing (44.92661438%)
13	39392569	21694821.2	17697747.38
14	42776607	23558525.55	19218081.13
15	58122175	32009849.32	26112325.22
16	59858352	32966021.05	26892331
17	40916621	22534168.58	18382452.62
18	41289426	22739484.97	18549941.34
19	39392569	21694821.2	17697747.38
20	42776607	23558525.55	19218081.13
21	58122175	32009849.32	26112325.22
22	59858352	32966021.05	26892331
23	40916621	22534168.58	18382452.62
24	41289426	22739484.97	18549941.34

Contoh perhitungan:

Disagregasi Printing Periode 13 = unit agregate ke 13 x 55.07338562%

= 39392569 x 55.07338562%

= 21694821.2

Disagregasi Dyeing Periode 13 = unit agregate ke 13 x 44.92661438%

= 39392569 x 44.92661438%

= 17697747.38

Tabel 4.19. Konversi Unit Agregat ke Satuan Individu meter

Periode	Printing (meter)	Dyeing (meter)
13	1205267.84	1041043.96
14	1308806.98	1130475.36
15	1778324.96	1536019.13
16	1831445.61	1581901.82
17	1251898.25	1081320.74
18	1263304.72	1091173.02
19	1205267.84	1041043.96
20	1308806.98	1130475.36
21	1778324.96	1536019.13
22	1831445.61	1581901.82
23	1251898.25	1081320.74
24	1263304.72	1091173.02

Contoh perhitungan Konversi Unit Agregat ke Satuan Individu meter:

Printing Periode 13 $= \frac{\text{Disagregasi printing ke 13}}{18}$

$= \frac{21694821.2}{18}$

= 1205267.84

Dyeing Periode 13 $= \frac{\text{Disagregasi dyeing ke 13}}{17}$

$= \frac{17697747.38}{17}$

= 1041043.96

4.2.5. *Master Production Schedule*

Pada dasarnya Jadwal Induk Produksi (MPS/JIP) merupakan suatu pernyataan tentang produk akhir (termasuk parts pengganti dan suku cadang) dari suatu perusahaan industry manufaktur yang merencanakan memproduksi output berkaitan dengan kuantitas dan periode waktu. Data – data yang dibutuhkan untuk membuat MPS adalah data konversi unit agregat ke satuan individu meter (tabel 4.19.), data *Actual Order* (tabel 4.3.), data *Inventory* (tabel 4.4.) dan data *Master Schedule* yang didapat dari hasil pembulatan per 1000 dari peramalan yang sudah dikonversi dalam satuan meter, dapat dilihat pada tabel 4.20.

Tabel 4.20. *Master Schedule*

Tahun	Bulan	Dyeing (meter)	Printing (meter)
2011	April	1042000	1205000
	Mei	1131000	1309000
	Juni	1537000	1779000
	Juli	1582000	1832000
	Agustus	1082000	1252000
	September	1092000	1264000
	Oktober	1042000	1205000
	November	1131000	1309000
	Desember	1537000	1779000
2012	Januari	1582000	1832000
	Februari	1082000	1252000
	Maret	1092000	1264000

.

Tabel 4.21. MPS *Polyster Dyeing*

Description : *Polyster Dyeing*										*Safety Stock* : 0			
Lead Time : 0										DTF : 4			
Order Qty : 0										PTF : 8			
Period	PD	1	2	3	4	5	6	7	8	9	10	11	12
FC		1041044	1130475	1536019	1581902	1081321	1091173	1041044	1130475	1536019	1581902	1081321	1091173
AO		854340	865410	1121340	1157340	859410	823920	808590	823650	1169340	1153740	794970	839790
PAB	728730	916390	1181980	1597640	2022300	2022979	2023806	2024762	2025287	2026268	2026366	2027045	2027872
ATP		1104050	265590	415660	424660	222590	268080	233410	307350	367660	428260	287030	252210
MS		1042000	1131000	1537000	1582000	1082000	1092000	1042000	1131000	1537000	1582000	1082000	1092000
PO													

Keterangan:

Tulisan warna Daerah DTF

Tulisan warna Daerah PTF

Tulisan warna Daerah setelah PTF

Tabel 4.22. MPS *Polyster Printing*

Description	*: Polyster Printing*									*Safety Stock*	: 0		
Lead Time	: 0									DTF	: 4		
Order Qty	: 0									PTF	: 8		
Period	PD	1	2	3	4	5	6	7	8	9	10	11	12
FC		1205268	1308807	1778325	1831446	1251898	1263305	1205268	1308807	1778325	1831446	1251898	1263305
AO		854700	824790	1125210	1178550	884220	802020	824490	794610	1097520	1129770	827550	899220
PAB	843690	1193990	1678200	2331990	2985440	2985542	2986237	2985969	2986162	2986837	2987392	2987493	2988189
ATP		1544290	484210	653790	653450	367780	461980	380510	514390	681480	702230	424450	364780
MS		1205000	1309000	1779000	1832000	1252000	1264000	1205000	1309000	1779000	1832000	1252000	1264000
PO													

Keterangan:

Tulisan warna Daerah DTF

Tulisan warna Daerah PTF

Tulisan warna Daerah setelah PTF

Contoh perhitungan:

- Menghitung Projected Available Balance (PAB):

Pada daerah DTF:

$PAB_t = PAB_{t-1} + MS_t - AO_t$

Polyster Dyeing $PAB_1 = 728730 + 1042000 - 854340 = 916390$

Polyster Printing $PAB_1 = 843690 + 1205000 - 854700 = 1193990$

Pada daerah PTF:

$PAB_t = PAB_{t-1} + MS_t - Max (AO_t , F_t)$

Polyster Dyeing $PAB_5 = 2022300 + 1082000 - 1081321 = 2022979$

Polyster Printing $PAB_5 = 2985440 + 1252000 - 1251898 = 2985542$

Pada daerah setelah PTF:

$PAB_t = PAB_{t-1} + MS_t - F_t$

Polyster Dyeing $PAB_9 = 2025287 + 1537000 - 1536019 = 2026268$

Polyster Printing $PAB_9 = 2986162 + 1779000 - 1778325 = 2986837$

- Menghitung Avaible to Promise (ATP):

Pada periode 1:

$ATP_1 = PAB_{now} + MS_t - \Sigma AO_{\text{sebelum ada MS berikutnya}}$

Polyster Dyeing $ATP_1 = 916390 + 1042000 - 854340 = 1104050$

Polyster Printing $ATP_1 = 1193990 + 1205000 - 854700 = 1544290$

Pada periode selanjutnya:

$ATP = MS_t - \Sigma AO_{\text{sebelum ada MS berikutnya}}$

Polyster Dyeing $ATP_5 = 1082000 - 859410 = 222590$

Polyster Printing $ATP_5 = 1252000 - 884220 = 367780$

- Menghitung Planned Order (PO):

Dihitung apabila PAB minus, perhitungan kebutuhan tergantung pada periode net requitment

$PO = \Sigma F + SS - PAB_{t-1}$

4.2.6. *Rought Cut Capacity Planning (RCCP)*

Rought Cut Capacity Planning (RCCP) atau perencanaan kapasitas kasar ini termasuk dalam perencanaan kapasitas jangka panjang. *Rought Cut Capacity Planning* (RCCP) merupakan kebutuhan kapasitas yang diperlukan untuk melaksanakan MPS. Data – data yang dibutuhkan untuk menghitung RCCP adalah data *Master Schedule* (tabel 4.20.), data hari kerja dan jam kerja (tabel 4.5.), data *Work Center* (tabel 4.6.), dan data *Run Time* (tabel 4.7.)

Tabel 4.23. *Routing Sheet*

Item	*Work center*	*Run time* (detik)	*Set up time* (detik)	*Lot size* (detik)	*Standard hour*
Polyster Dyeing	SP1	158040	1200	1000	43,90
	SP2	86400	300	1000	24,00
	SP3	86400	600	1000	24,00
	SP4	46800	300	1000	13,00
	SP5	140160	900	1000	38,93
	SP6	5400	600	1000	1,50
Polyster Printing	SP1	158040	1200	1000	43,90
	SP2	86400	300	1000	24,00
	SP3	86400	600	1000	24,00
	SP4	46800	300	1000	13,00
	SP5	96960	900	1000	26,93
	SP6	5400	600	1000	1,50

Contoh perhitungan:

$$Standar\ Hour\ (Jam) = \frac{Run\ Time + \frac{Set\ Up}{Lot\ Size}}{3600}$$

$$\text{SP 5 Polyster Dyeing} \rightarrow \text{Standar Hour (Jam)} = \frac{140160 + \frac{900}{1000}}{3600} = 38{,}93$$

$$\text{SP 5 Polyster Printing} \rightarrow \text{Standar Hour (Jam)} = \frac{96960 + \frac{900}{1000}}{3600} = 26{,}93$$

RCCP

Tabel 4.24. RCCP Work Center SP 1

Item	periode											
	1	2	3	4	5	6	7	8	9	10	11	12
Dyeing	45744.15	49651.28	67474.81	69450.33	47500.16	47939.16	45744.15	49651.28	67474.81	69450.33	47500.16	47939.16
Printing	52899.90	57465.54	78098.69	80425.41	54963.22	55490.02	52899.90	57465.54	78098.69	80425.41	54963.22	55490.02
Total	98644.05	107116.81	145573.51	149875.74	102463.38	103429.19	98644.05	107116.81	145573.51	149875.74	102463.38	103429.19

Tabel 4.25. RCCP Work Center SP 2

Item	periode											
	1	2	3	4	5	6	7	8	9	10	11	12
Dyeing	25008.09	27144.09	36888.13	37968.13	25968.09	26208.09	25008.09	27144.09	36888.13	37968.13	25968.09	26208.09
Printing	28920.10	31416.11	42696.15	43968.15	30048.10	30336.11	28920.10	31416.11	42696.15	43968.15	30048.10	30336.11
Total	53928.19	58560.20	79584.28	81936.28	56016.19	56544.20	53928.19	58560.20	79584.28	81936.28	56016.19	56544.20

Tabel 4.26. RCCP Work Center SP 3

Item	periode											
	1	2	3	4	5	6	7	8	9	10	11	12
Dyeing	25008.17	27144.19	36888.26	37968.26	25968.18	26208.18	25008.17	27144.19	36888.26	37968.26	25968.18	26208.18
Printing	28920.20	31416.22	42696.30	43968.31	30048.21	30336.21	28920.20	31416.22	42696.30	43968.31	30048.21	30336.21
Total	53928.37	58560.41	79584.55	81936.57	56016.39	56544.39	53928.37	58560.41	79584.55	81936.57	56016.39	56544.39

Tabel 4.27. RCCP Work Center SP 4

Item	periode											
	1	2	3	4	5	6	7	8	9	10	11	12
Dyeing	13546.09	14703.09	19981.13	20566.13	14066.09	14196.09	13546.09	14703.09	19981.13	20566.13	14066.09	14196.09
Printing	15665.10	17017.11	23127.15	23816.15	16276.10	16432.11	15665.10	17017.11	23127.15	23816.15	16276.10	16432.11
Total	29211.19	31720.20	43108.28	44382.28	30342.19	30628.20	29211.19	31720.20	43108.28	44382.28	30342.19	30628.20

Tabel 4.28. RCCP Work Center SP 5

Item	periode											
	1	2	3	4	5	6	7	8	9	10	11	12
Dyeing	40568.79	44033.88	59840.92	61592.93	42126.14	42515.47	40568.79	44033.88	59840.92	61592.93	42126.14	42515.47
Printing	32454.97	35256.06	47914.84	49342.32	33720.85	34044.05	32454.97	35256.06	47914.84	49342.32	33720.85	34044.05
Total	73023.76	79289.94	107755.76	110935.25	75846.98	76559.52	73023.76	79289.94	107755.76	110935.25	75846.98	76559.52

Tabel 4.29. RCCP Work Center SP 6

Item	periode											
	1	2	3	4	5	6	7	8	9	10	11	12
Dyeing	1563.17	1696.69	2305.76	2373.26	1623.18	1638.18	1563.17	1696.69	2305.76	2373.26	1623.18	1638.18
Printing	1807.70	1963.72	2668.80	2748.31	1878.21	1896.21	1807.70	1963.72	2668.80	2748.31	1878.21	1896.21
Total	3370.87	3660.41	4974.55	5121.57	3501.39	3534.39	3370.87	3660.41	4974.55	5121.57	3501.39	3534.39

Contoh perhitungan:

RCCP = *Master Schedule x Standard Hour*

Untuk RCCP Work Center SP 1 periode ke-2:

Polyster Dyeing → RCCP = 1131 x 43,90 = 49651.28

Polyster Printing → RCCP = 1309 x 43,90 = 57465.54

Kapasitas Produksi

Tabel 4.30. Kapasitas yang dibutuhkan

Item	Periode											
	1	2	3	4	5	6	7	8	9	10	11	12
SP1	98644.05	107116.8	145573.5	149875.7	102463.4	103429.2	98644.05	107116.8	145573.5	149875.7	102463.4	103429.2
SP2	53928.19	58560.2	79584.28	81936.28	56016.19	56544.2	53928.19	58560.2	79584.28	81936.28	56016.19	56544.2
SP3	53928.37	58560.41	79584.55	81936.57	56016.39	56544.39	53928.37	58560.41	79584.55	81936.57	56016.39	56544.39
SP4	29211.19	31720.2	43108.28	44382.28	30342.19	30628.2	29211.19	31720.2	43108.28	44382.28	30342.19	30628.2
SP5	73023.76	79289.94	107755.8	110935.3	75846.98	76559.52	73023.76	79289.94	107755.8	110935.3	75846.98	76559.52
SP6	3370.875	3660.407	4974.553	5121.569	3501.389	3534.393	3370.875	3660.407	4974.553	5121.569	3501.389	3534.393
TOTAL	312106.4	338908	460580.9	474187.7	324186.5	327239.9	312106.4	338908	460580.9	474187.7	324186.5	327239.9

Keterangan: kapasitas yang dibutuhkan didapat dari jumlah RCCP pada masing-masing *work center*.

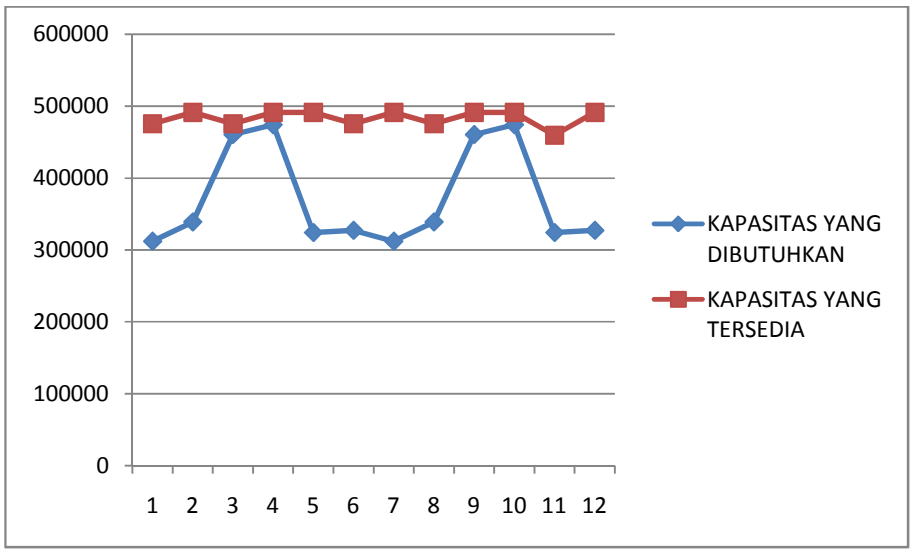
Tabel 4.31. Kapasitas yang Tersedia

Item	Periode											
	1	2	3	4	5	6	7	8	9	10	11	12
SP1	108000	111600	108000	111600	111600	108000	111600	108000	111600	111600	104400	111600
SP2	57600	59520	57600	59520	59520	57600	59520	57600	59520	59520	55680	59520
SP3	90000	93000	90000	93000	93000	90000	93000	90000	93000	93000	87000	93000
SP4	61200	63240	61200	63240	63240	61200	63240	61200	63240	63240	59160	63240
SP5	86400	89280	86400	89280	89280	86400	89280	86400	89280	89280	83520	89280
SP6	72000	74400	72000	74400	74400	72000	74400	72000	74400	74400	69600	74400
TOTAL	475200	491040	475200	491040	491040	475200	491040	475200	491040	491040	459360	491040

Contoh perhitungan:

Kapasitas Yang Tersedia = Jam Kerja x Hari Kerja x Tenaga Kerja

Load Leveling



Gambar 4.2.6.2.1. *Load Leveling*

Dari data hasil diatas didapatkan bahwa, kapasitas yang tersedia pada masing-masing work center untuk tiap periode melebihi kapasitas yang dibutuhkan. Maka keputusannya dalam proses produksi tidak terdapat masalah mengenai kapasitas yang dibutuhkana maupun kapasitas yang tersedia, sehingga proses produksi dapat dilaksanakan.

4.2.7. *Material Requirement Planning* (MRP)

Rencana kebutuhan material merupakan suatu prosedur yang digunakan untuk mengubah jadwal induk produksi produk akhir, menjadi jadwal yang mendetail untuk bahan mentah dan komponen – komponennya. Data – data yang dibutuhkan untuk menghitung MRP adalah data *Master Schedule* (tabel 4.20.) dan data Kebutuhan material per satuan produksi (tabel 4.8.)

4.2.7.1. Kebutuhan Komponen Benang

Perhitungan kebutuhan *demand* untuk komponen benang

Tabel 4.32. *Demand* untuk benang tiap periode

Periode	1	2	3	4	5	6	7	8	9	10	11	12
Demand	674.1	732	994.8	1024.2	700.2	706.8	674.1	732	994.8	1024.2	700.2	706.8
Round up Demand	675	732	995	1025	701	707	675	732	995	1025	701	707

$$Demand = \frac{\sum \text{data } master\ schedule \text{ produk X kebutuhan produk}}{\text{kapasitas/satuan}}$$

Periode 2 $= \frac{2440000\ x\ 0{,}3}{1000} = 732$

Periode 12 $= \frac{2356000\ x\ 0{,}3}{1000} = 706{,}8 \Rightarrow 707$

Metode *Economic Order Quantity* (EOQ) Komponen Benang

A (ongkos Pesan) = Rp. 1.500.000

h (ongkos simpan) = Rp. 50.000

λ (Rata-rata *demand* per periode) = 9670 / 12 = 805,83

$$EOQ = \sqrt{\frac{2.A.\lambda}{h}} = \sqrt{\frac{2.(1500000).(805,83)}{50000}} = 219,88 \approx 220$$

Tabel 4.33. MRP untuk Benang

Part Number	: 1								*Description*	: Benang			
BOM UOM									*On Hand*	: 725			
Lead Time	: 1								*Order Policy*	: EOQ			
Safety stock	: 350								*Lot Size*	: 220			
Periode	*Past Due*	1	2	3	4	5	6	7	8	9	10	11	12
Gross Requirement		675	732	995	1025	701	707	675	732	995	1025	701	707
Schedule Receipt													
PAB I	725	50	-682	-577	-502	-323	-150	-165	-237	-572	-497	-318	-145
Net Requirement		0	1032	927	852	673	500	515	587	922	847	668	495
Planned Order Receipt		0	1100	1100	880	880	660	660	660	1100	880	880	660
Planned Order Release		1100	1100	880	880	660	660	660	1100	880	880	660	
PAB II		50	418	523	378	557	510	495	423	528	383	562	515

4.2.7.2. Kebutuhan Komponen Zat Pewarna 1

Perhitungan kebutuhan *demand* untuk komponen Zat pewarna 1

Tabel 4.34. *Demand* untuk Zat pewarna 1 tiap periode

Periode	1	2	3	4	5	6	7	8	9	10	11	12
Demand	44.94	48.8	66.32	68.28	46.68	47.12	44.94	48.8	66.32	68.28	46.68	47.12
Round up Demand	45	49	67	69	47	48	45	49	67	69	47	48

$$Demand = \frac{\sum \text{ data } master\ schedule \text{ produk X kebutuhan produk}}{\text{kapasitas/satuan}}$$

Periode 2 $= \frac{2440000\ x\ 0{,}02}{1000} = 48{,}8 \Rightarrow 49$

Periode 12 $= \frac{2356000\ x\ 0{,}02}{1000} = 47{,}12 \Rightarrow 48$

Metode *Economic Order Quantity* (EOQ) Komponen Zat Pewarna 1

A (ongkos Pesan) = Rp. 500.000

h (ongkos simpan) = Rp. 50.000

λ (Rata-rata *demand* per periode) = 650 / 12 = 54,17

$$EOQ = \sqrt{\frac{2.A.\lambda}{h}} = \sqrt{\frac{2.(500000).(54{,}17)}{50000}} = 32{,}92 \approx 33$$

Tabel 4.35. MRP untuk Zat Pewarna 1

Part Number	: 2								*Description*	: Zat Pewarna 1			
BOM UOM									*On Hand*	: 50			
Lead Time	: 1								*Order Policy*	: EOQ			
Safety stock	: 15								*Lot Size*	: 33			
Periode	*Past Due*	1	2	3	4	5	6	7	8	9	10	11	12
Gross Requirement		45	49	67	69	47	48	45	49	67	69	47	48
Schedule Receipt													
PAB I	50	5	-44	-45	-48	-29	-11	-23	-6	-40	-43	-24	-6
Net Requirement		0	59	60	63	44	26	38	21	55	58	39	21
Planned Order Receipt		0	66	66	66	66	33	66	33	66	66	66	33
Planned Order Release		66	66	66	66	33	66	33	66	66	66	33	
PAB II		5	22	21	18	37	22	43	27	26	23	42	27

4.2.7.3. Kebutuhan Komponen Zat Pewarna 2

Perhitungan kebutuhan *demand* untuk komponen Zat pewarna 2

Tabel 4.36. *Demand* untuk Zat Pewarna 2 tiap periode

Periode	1	2	3	4	5	6	7	8	9	10	11	12
Demand	89.88	97.6	132.6	136.56	93.36	94.24	89.88	97.6	132.6	136.56	93.36	94.24
Round up Demand	90	98	133	137	94	95	90	98	133	137	94	95

$$Demand = \frac{\sum \text{data } master\ schedule \text{ produk X kebutuhan produk}}{\text{kapasitas/satuan}}$$

Periode 2 $= \frac{2440000\ x\ 0{,}04}{1000} = 97{,}6 \Rightarrow 98$

Periode 12 $= \frac{2356000\ x\ 0{,}04}{1000} = 94{,}24 \Rightarrow 95$

Metode *Economic Order Quantity* (EOQ) Komponen Zat Pewarna 2

A (ongkos Pesan) = Rp. 500.000

h (ongkos simpan) = Rp. 50.000

λ (Rata-rata *demand* per periode) = 1294 / 12 = 107,83

$$EOQ = \sqrt{\frac{2.A.\lambda}{h}} = \sqrt{\frac{2.(500000).(107{,}83)}{50000}} = 46{,}44 \approx 47$$

Tabel 4.37. MRP untuk Zat Pewarna 2

Part Number	: 3										*Description*	: Zat Pewarna 2	
BOM UOM											*On Hand*	: 105	
Lead Time	: 1										*Order Policy*	: EOQ	
Safety stock	: 20										*Lot Size*	: 47	
Periode	*Past Due*	1	2	3	4	5	6	7	8	9	10	11	12
Gross Requirement		90	98	133	137	94	95	90	98	133	137	94	95
Schedule Receipt													
PAB I	105	15	-83	-75	-71	-71	-72	-68	-72	-111	-107	-60	-61
Net Requirement		0	103	95	91	91	92	88	92	131	127	80	81
Planned Order Receipt		0	141	141	94	94	94	94	94	141	141	94	94
Planned Order Release		141	141	94	94	94	94	94	141	141	94	94	
PAB II		15	58	66	23	23	22	26	22	30	34	34	33

4.2.7.4. Kebutuhan Komponen Kanji

Perhitungan kebutuhan *demand* untuk komponen Kanji

Tabel 4.38. *Demand* untuk Kanji tiap periode

Periode	1	2	3	4	5	6	7	8	9	10	11	12
Demand	22.47	24.4	33.16	34.14	23.34	23.56	22.47	24.4	33.16	34.14	23.34	23.56
Round up Demand	23	25	34	35	24	24	23	25	34	35	24	24

$$Demand = \frac{\sum \text{data } master\ sch\square dule \text{ produk X kebutuhan produk}}{\text{kapasitas/satuan}}$$

Periode 2 $= \frac{2440000\ x\ 0{,}01}{1000} = 24{,}4 \Rightarrow 25$

Periode 12 $= \frac{2356000\ x\ 0{,}01}{1000} = 23{,}56 \Rightarrow 24$

Metode *Economic Order Quantity* (EOQ) Komponen Kanji

A (ongkos Pesan) = Rp. 700.000

h (ongkos simpan) = Rp. 50.000

λ (Rata-rata *demand* per periode) = 330 / 12 = 27,5

$$EOQ = \sqrt{\frac{2.A.\lambda}{h}} = \sqrt{\frac{2.(700000).(27{,}5)}{50000}} = 27{,}75 \approx 28$$

Tabel 4.39. MRP untuk Kanji

Part Number	: 4										*Description*	: Kanji	
BOM UOM											*On Hand*	: 25	
Lead Time	: 1										*Order Policy*	: EOQ	
Safety stock	: 5										*Lot Size*	: 28	
Periode	*Past Due*	1	2	3	4	5	6	7	8	9	10	11	12
Gross Requirement		23	25	34	35	24	24	23	25	34	35	24	24
Schedule Receipt													
PAB I	25	2	-23	-29	-8	-4	0	5	-20	-26	-5	-1	3
Net Requirement		0	28	34	13	9	5	0	25	31	10	6	2
Planned Order Receipt		0	28	56	28	28	28	0	28	56	28	28	28
Planned Order Release		28	56	28	28	28	0	28	56	28	28	28	
PAB II		2	5	27	20	24	28	5	8	30	23	27	31

4.2.7.5. Kebutuhan Komponen *Packing Plastic*

Perhitungan kebutuhan demand untuk komponen Pac*king Plastic*

Tabel 4.40. Demand untuk *Packing Plastic* tiap periode

Periode	1	2	3	4	5	6	7	8	9	10	11	12
Demand	4.494	4.88	6.632	6.828	4.668	4.712	4.494	4.88	6.632	6.828	4.668	4.712
Round up Demand	5	5	7	7	5	5	5	5	7	7	5	5

$$Demand = \frac{\sum \text{ data } master\ schedule \text{ produk X kebutuhan produk}}{\text{kapasitas/satuan}}$$

Periode 2 $= \frac{2440000\ x\ 0{,}002}{1000} = 4{,}88 \Rightarrow 5$

Periode 12 $= \frac{2356000\ x\ 0{,}002}{1000} = 4{,}712 \Rightarrow 5$

Metode *Economic Order Quantity* (EOQ) Komponen *Packing Plastic*

A (ongkos Pesan) = Rp. 900.000

h (ongkos simpan) = Rp. 50.000

λ (Rata-rata *demand* per periode) = 68 / 12 = 5,67

$$EOQ = \sqrt{\frac{2.A.\lambda}{h}} = \sqrt{\frac{2.(900000).(5{,}57)}{50000}} = 14{,}16 \approx 15$$

Tabel 4.41. MRP untuk *Packing Plastic*

Part Number	: 5								*Description*	: *Packing Plastic*			
BOM UOM									*On Hand*	: 6			
Lead Time	: 1								*Order Policy*	: EOQ			
Safety stock	: 5								*Lot Size*	: 15			
Periode	*Past Due*	1	2	3	4	5	6	7	8	9	10	11	12
Gross Requirement		5	5	7	7	5	5	5	5	7	7	5	5
Schedule Receipt													
PAB I	6	1	-4	4	-3	7	2	-3	7	0	8	3	13
Net Requirement		0	9	0	8	0	0	8	0	5	0	2	0
Planned Order Receipt		0	15	0	15	0	0	15	0	15	0	15	0
Planned Order Release		15	0	15	0	0	15	0	15	0	15	0	
PAB II		1	11	4	12	7	2	12	7	15	8	18	13

Tabel 4.42. Rencana Pemenuhan Pesanan untuk 12 periode ke depan

Item	Periode												Satuan
	1	2	3	4	5	6	7	8	9	10	11	12	
Benang	50	418	523	378	557	510	495	423	528	383	562	515	Ton
Zat pewarna 1	5	22	21	18	37	22	43	27	26	23	42	27	Ton
Zat pewarna 2	15	58	66	23	23	22	26	22	30	34	34	33	Ton
Kanji	2	5	27	20	24	28	5	8	30	23	27	31	Ton
Packing Plastic	1	11	4	12	7	2	12	7	15	8	18	13	Ton