







No	Model Kayu	Jenis Produk	Periode (bulan)												Total Permintaan per Model
			1	2	3	4	5	6	7	8	9	10	11	12	
			Nov'14	Des'14	Jan'15	Feb'15	Mar'15	Apr'15	Mei'15	Jun'15	Jul '15	Agt'15	Sep'15	Okt'15	
14	Eks trem	SC 41	0	3	15	8	16	24	25	5	2	3	5	4	110
15	Hak BL	SC 44													
		SC 45	9	10	23	25	16	19	57	13	3	21	13	21	230
		SC 66													
		SC 94													
16	HTUA	SC 46													
		SC 47													
		SC 55	67	13	39	21	45	67	70	37	28	83	18	33	521
		SC 65													
		SC 87													
17	JPT BL	SC 50	13	4	26	27	15	7	39	10	6	17	2	14	180
		SC 73													
18	AN	SC 51													
		SC 54	24	4	17	14	10	13	4	0	3	9	2	6	106
		SC 90													
19	JH	SC 56													
		SC 58	3	16	49	51	79	49	105	34	201	83	20	44	734
20	T KJG	SC 89													
		SC 57	4	4	42	51	43	60	40	27	23	29	17	41	381

No	Model Kayu	Jenis Produk	Periode (bulan)												Total Permintaan per Model
			1	2	3	4	5	6	7	8	9	10	11	12	
			Nov'14	Des'14	Jan'15	Feb'15	Mar'15	Apr'15	Mei'15	Jun'15	Jul '15	Agt'15	Sep'15	Okt'15	
		SC 67													
21	CTR	SC 61	15	4	26	21	21	10	23	7	2	22	9	19	179
22	Roda	SC 81 SC 95	3	1	10	9	6	6	8	4	0	13	0	0	60
23	CKS	SC 85	10	0	0	6	7	0	2	3	6	8	11	0	53
24	KJG	SC 97	5	2	11	31	10	8	9	6	0	16	0	25	123
		SC 71 SC 72 SC 77 SC 78 SC 79													
25	TK	SC 77	13	0	24	5	31	2	22	4	9	16	3	3	132
26	WED LKEN	SC 69 SC 82	5	30	24	67	96	32	49	18	6	51	13	26	417
27	WED	SC 98	11	1	6	31	22	44	26	14	4	21	6	19	205
28	MTHR BR	SC 75 SC 76	15	3	0	4	1	2	11	6	5	25	2	4	78
29	Hak Q	Hak Q	1	0	6	17	3	0	0	1	0	1	12	0	41
Total Permintaan per Periode (bulan)			379	401	680	756	716	565	836	315	472	868	319	347	6654

Sumber : data diolah.

## Lampiran 2

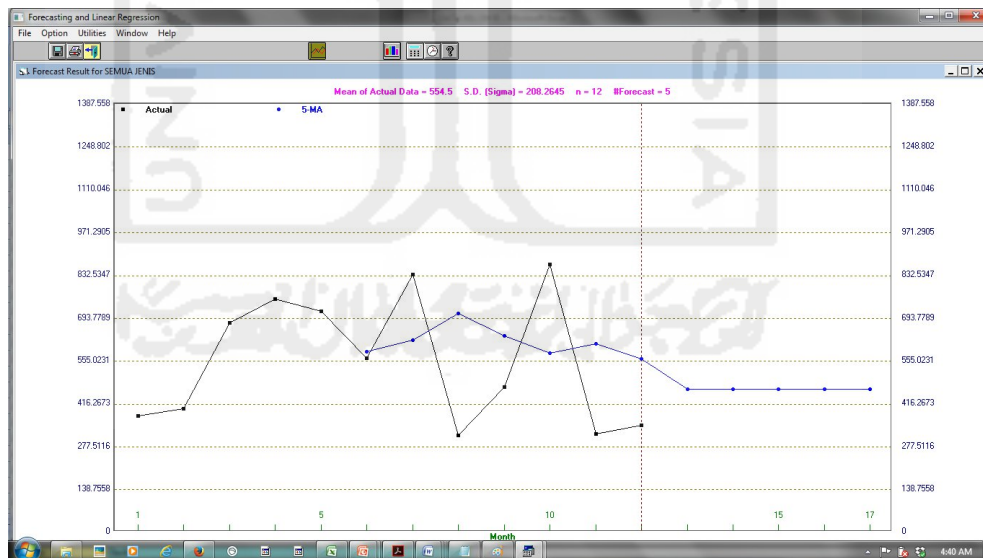
Peramalan menggunakan metode *Moving Average* (MA) pada *software* WinQSB dengan menggunakan 5 periode peramalan.

Forecast Result for SEMUA JENIS

12-09-2015 Month	Data	Actual 5-MA	Forecast by Error	Forecast	CFE	MAD Signal	MSE	MAPE (%)	Tracking	R-square
1	379									
2	401									
3	680									
4	756									
5	716									
6	565	586.4	-21.40002	-21.40002	21.40002		457.9611	3.787615	-1	
7	836	623.6	212.4	191	116.9	22785.87	14.59716	1.633875	0.5155817	
8	315	710.6	-395.6	-204.6	209.8	67357.02	51.59387	-0.9752144	0.1625983	
9	472	637.6	-165.6	-370.2	198.75	57373.61	47.46659	-1.862641	0.2958479	
10	868	580.8	287.2	-82.99994	216.44	62395.65	44.59078	-0.3834778	5.435894E-02	
11	319	611.2	-292.2	-375.2	229.0667	66226.52	52.42545	-1.637951	0.1164945	
12	347	562	-215	-590.2	227.0571	63369.16	53.78748	-2.599346	0.1909508	
13		464.2								
14		464.2								
15		464.2								
16		464.2								
17		464.2								
CFE		-590.2								
MAD		227.0571								
MSE		63369.16								
MAPE		53.78748								
Trk.Signal		-2.599346								
R-square		0.1909508								
		m=5								

Gambar 1. Perhitungan Metode *Moving Average*

Pada Gambar 1 diatas dapat dilihat bahwa perhitungan peramalan metode *Moving Average* (MA) menggunakan *software* WinQSB menghasilkan nilai MAD = 227.0571, nilai MSE = 63369.16 dan nilai MAPE = 53.78748.



Gambar 2. Grafik Metode *Moving Average*

Pada Gambar 2 diatas ini dapat dilihat grafik yang menunjukkan perbedaan antara volume *actual demand* (garis hitam) dengan volume *forecast demand* (garis biru) metode *moving average*.

### Lampiran 3

Peramalan menggunakan metode *Weighted Moving Average* (WMA) pada *software* WinQSB dengan menggunakan 5 periode peramalan.

Forecast Result for SEMUA JENIS

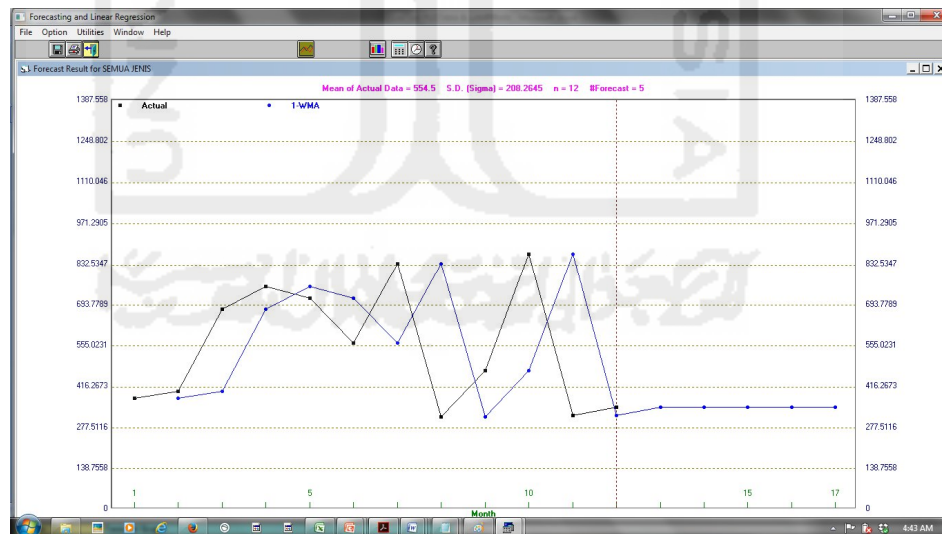
Month	Data	Actual	Forecast by 5-WMA	Forecast Error	Forecast	CFE	MAD	MSE	MAPE (%)	Tracking	R-square
1	379										
2	401										
3	680										
4	756										
5	716										
6	565	586.4	-21.40002	-21.40002	21.40002			457.9611	3.787615	-1	
7	836	623.6	212.4	190.9999	116.9	22785.85	14.59715	1.633875	0.5155814		
8	315	710.6	-395.6	-204.6001	209.8	67357.03	51.59387	-0.975215	0.1625985		
9	472	637.6	-165.6	-370.2001	198.75	57373.61	47.46659	-1.862642	0.2958481		
10	868	580.8	287.2	-83.00012	216.44	62395.65	44.59078	-0.3834787	5.435899E-02		
11	319	611.2	-292.2	-375.2001	229.0667			66226.52	52.42545	-1.637952	0.1164946
12	347	562	-215	-590.2001	227.0571			63369.16	53.78748	-2.599346	0.1909509
13		464.2									
14		464.2									
15		464.2									
16		464.2									
17		464.2									

CFE -590.2001  
MAD 227.0571  
MSE 63369.16  
MAPE 53.78748  
Trk.Signal -2.599346  
R-square 0.1909509

m=5  
W(1)=0.2  
W(2)=0.2  
W(3)=0.2  
W(4)=0.2  
W(5)=0.2

Gambar 3. Perhitungan Metode *Weighted Moving Average* (WMA)

Pada Gambar 3 diatas dapat dilihat bahwa perhitungan peramalan metode *Weighted Moving Average* (WMA) menggunakan *software* WinQSB menghasilkan nilai MAD = 227.0571, nilai MSE = 63369.16 dan nilai MAPE = 53.78748.



Gambar 4. Grafik Metode *Weighted Moving Average* (WMA)

Pada Gambar 4 diatas ini dapat dilihat grafik yang menunjukkan perbedaan antara volume *actual demand* (garis hitam) dengan volume *forecast demand* (garis biru) metode *weighted moving average*.

#### Lampiran 4

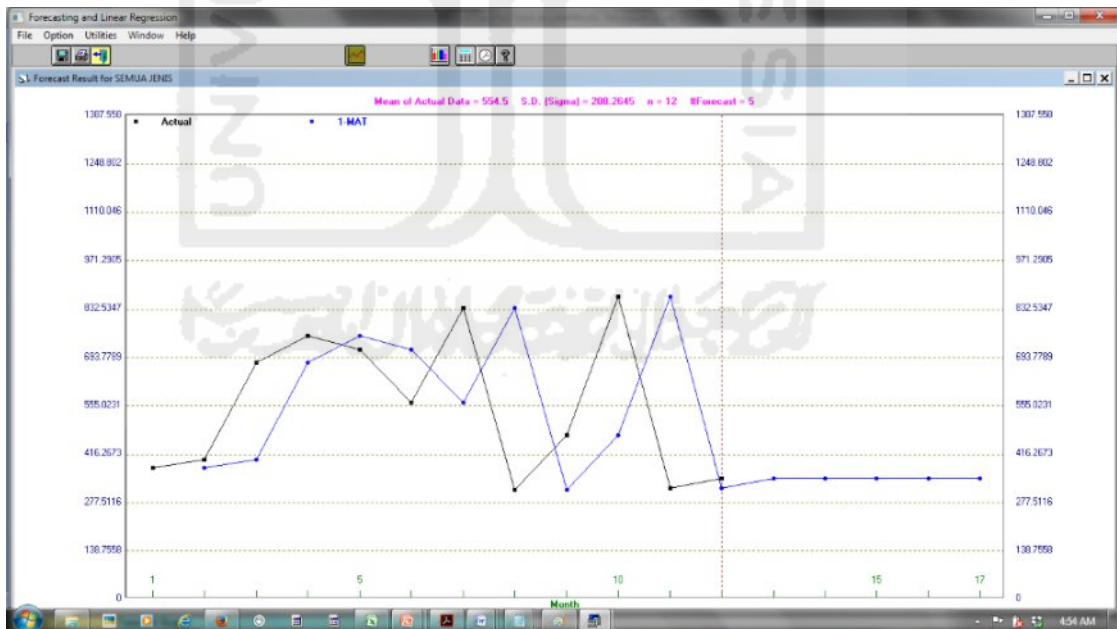
Peramalan menggunakan metode *Moving Average with Linear Trend* (MAT) software WinQSB.

Forecast Result for SEMUA JENIS

12-09-2015 Month	Data	Actual 5-MAT	Forecast by Error	Forecast	CFE	MAD Signal	MSE	MAPE (%)	Tracking	R-square
1	379									
2	401									
3	680									
4	756									
5	716									
6	565	895.1	-330.1	330.1	108966	58.42479	-1			
7	836	732.8	103.2	-226.9	216.65	59808.14	35.38464	-1.047311		
8	315	746.9	-431.9	-658.8	288.4	102051.3	69.29346	-2.284327		
9	472	408.9999	63.00012	-595.7999		232.05	77530.72	55.30697	-2.567549	
10	868	359.3998	508.6002	-87.19971		287.36	113759.4	55.96447	-0.3034511	0.9661613
11	319	683.7998	-364.7998	-451.9995		300.2667		116979.3	65.69661	-1.505327
12	347	417.6997	-70.69968	-522.6992		267.4714		100982	59.22203	0.8527214
13		437.4996								0.8900645
14		428.5994								
15		419.6993								
16		410.7991								
17		401.899								
CFE		-522.6992								
MAD		267.4714								
MSE		100982								
MAPE		59.22203								
Trk. signal		-1.954225								
R-square		0.8900645								
		m=5								

Gambar 5. Perhitungan Metode *Moving Average with Linear Trend* (MAT)

Pada Gambar 5 diatas dapat dilihat bahwa perhitungan peramalan metode *Moving Average with Linear Trend* (MAT) menggunakan software WinQSB menghasilkan nilai MAD = 267.4714, nilai MSE = 100982 dan nilai MAPE = 59.22203.



Gambar 6. Grafik Metode *Moving Average with Linear Trend* (MAT)

Pada Gambar 6 diatas ini dapat dilihat grafik yang menunjukkan perbedaan antara volume *actual demand* (garis hitam) dengan volume *forecast demand* (garis biru) metode *moving average with linear trend*.



Lampiran 5

Peramalan menggunakan metode *Exponential Smoothing*

Peramalan permintaan konsumen dengan metode *exponential smoothing* menggunakan nilai  $\alpha = 0.9$ . Hasil perhitungan peramalan permintaan konsumen dengan metode ini dapat dilihat pada tabel berikut.

Tabel 2. Peramalan dengan Metode *Exponential Smoothing*

Periode	Demand	Peramalan	FE	Abs FE	Kesalahan % Abs	Kesalahan Kuadrat
n	Xi	Fi	Xi - Fi	(Xi - Fi)	$((Xi - Fi)/Xi)100$	$(Xi - Fi)^2$
1	379	-	-	-	-	-
2	401	379	22.00	22	5.49	484.00
3	680	401.00	279.00	279	41.03	77841.00
4	756	680.00	76.00	76	10.05	5776.00
5	716	756.00	-40.00	40	5.59	1600.00
6	565	716.00	-151.00	151	26.73	22801.00
7	836	565.00	271.00	271	32.42	73441.00
8	315	836.00	-521.00	521	165.40	271441.00
9	472	315.00	157.00	157	33.26	24649.00
10	868	472.00	396.00	396	45.62	156816.00
11	319	868.00	-549.00	549	172.10	301401.00
12	347	319.00	28.00	28	8.07	784.00
<b>Total</b>			-32.00	2490.00	545.75	937034.00
			<b>-2.91</b>	<b>226.36</b>	<b>49.61</b>	<b>85184.91</b>
			<b>AE</b>	<b>MAD</b>	<b>MAPE</b>	<b>MSE</b>

Sumber : data diolah

Pada Tabel 2 diatas dapat dilihat bahwa perhitungan peramalan metode *Exponential Smoothing* (ES) menggunakan nilai  $\alpha = 0.9$  menghasilkan nilai MAD = 226.36, nilai MSE = 85184.91 dan nilai MAPE = 49.61.

## Lampiran 6

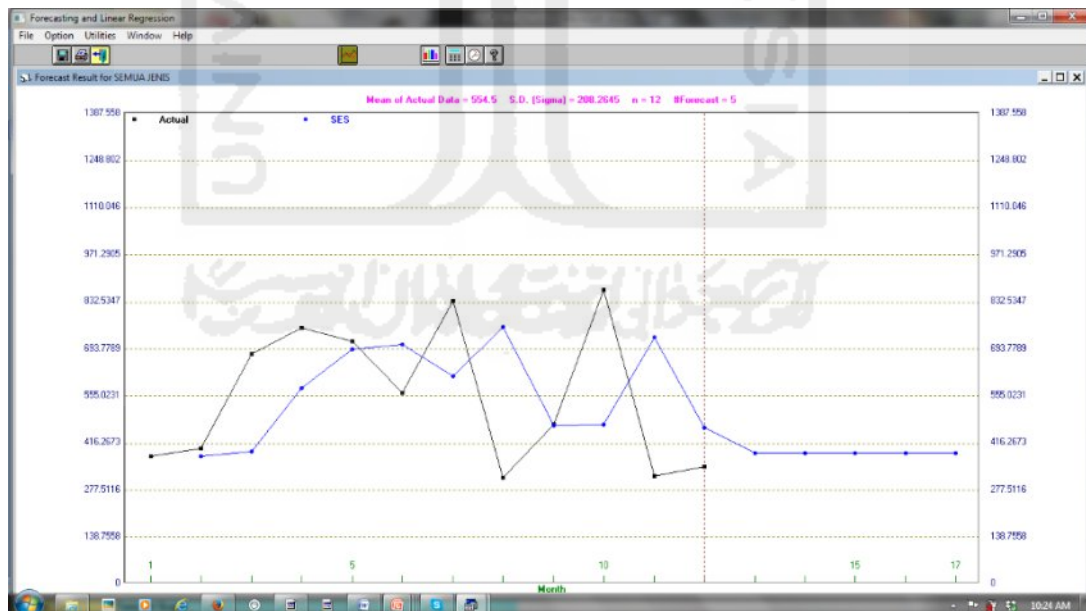
Peramalan menggunakan metode *Single Exponential Smoothing* (SES) software WinQSB.

Forecast Result for SEMUA JENIS

Month	Data	Actual SES	Forecast by Error	Forecast	CFE	MAD Signal	MSE	MAPE (%)	Tracking	R-square
1	379									
2	401	379	22	22	484	5.486284	1			
3	680	393.3	286.7	308.7	154.35	41340.45	23.82403	2		
4	756	579.6549	176.3451	485.0451		161.6817	37926.16		23.65804	3
5	716	694.2792	21.72083	506.7659		126.6915	28562.57		18.50194	4
6	565	708.3977	-143.3977	363.3682		130.0327	26962.64		19.87758	2.794437
7	836	615.1893	220.8107	584.179	145.1624	140.4628	30595.09	20.96678	4.024313	
8	315	758.7162	-443.7162	140.4628	187.8129	187.8129	54350.66	38.0947	0.7478865	0.6333258
9	472	470.3008	1.699188	142.162	164.5487	47557.19	47557.19	33.37786	0.8639506	0.6403431
10	868	471.4053	396.5947	538.7567	190.3316	190.3316	59749.43	34.74595	2.830621	0.6274855
11	319	729.1917	-410.1917	128.565	212.3176	70600.21	70600.21	44.13003	0.6055315	0.4779315
12	347	462.5672	-115.5672	12.99777		203.5221	65396.17	43.14591	43.14591	6.386417E-02
13		387.4486								0.4432917
14		387.4486								
15		387.4486								
16		387.4486								
17		387.4486								
CFE		12.99777								
MAD		203.5221								
MSE		65396.17								
MAPE		43.14591								
Trk. Signal			6.386417E-02							
R-square			0.4432917							
			Alpha=0.65							
			F(0)=379							

Gambar 7. Perhitungan Metode *Single Exponential Smoothing* (SES)

Pada Gambar 7 diatas dapat dilihat bahwa perhitungan peramalan metode *Single Exponential Smoothing* (SES) menggunakan software WinQSB menghasilkan nilai MAD = 203.99777, nilai MSE = 65396.17 dan nilai MAPE = 43.14591.



Gambar 8. Grafik Metode *Single Exponential Smoothing* (SES)

Pada Gambar 8 diatas ini dapat dilihat grafik yang menunjukkan perbedaan antara volume *actual demand* (garis hitam) dengan volume *forecast demand* (garis biru) metode *single exponential smoothing*.

Lampiran 7

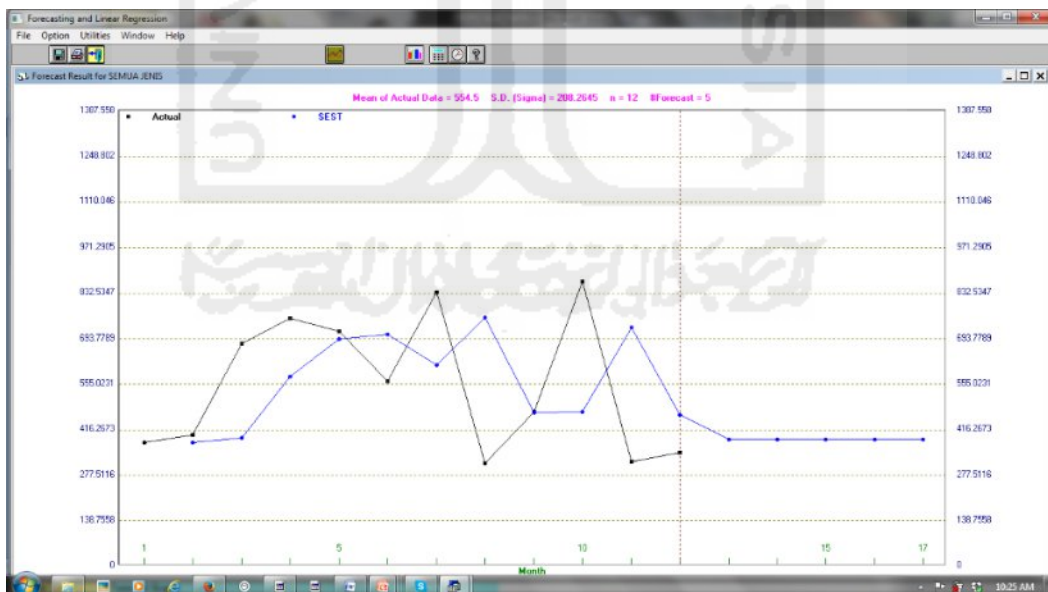
Peramalan menggunakan metode *Single Exponential Smoothing with Trend* (SEST) software WinQSB.

Forecast Result for SEMUA JENIS

Month	Data	Actual SEST	Forecast by Error	Forecast	CFE	MAD Signal	MSE	MAPE (%)	Tracking	R-square
1	379									
2	401	379	22	22	484	5.486284	1			
3	680	393.3	286.7	308.7	154.35	41340.45	23.82403	2		
4	756	579.6549	176.3451	485.0451		161.6817	37926.16		23.65804	3
5	716	694.2792	21.72083	506.7659		126.6915	28562.57		18.50194	4
6	565	708.3977	-143.3977	363.3682		130.0327	26962.64		19.87758	2.794437
7	836	615.1893	220.8107	584.179	145.1624		30595.09	20.96678	4.024313	
8	315	758.7162	-443.7162	140.4628		187.8129	54350.66		38.0947	0.7478865
9	472	470.3008	1.699188	142.162	164.5487		47557.19	33.37786	0.8639506	0.6403431
10	868	471.4053	396.5947	538.7567		190.3316	59749.43		34.74595	2.830621
11	319	729.1917	-410.1917	128.565	212.3176		70600.21	44.13003	0.6055315	0.4779315
12	347	462.5672	-115.5672	12.99777		203.5221	65396.17		43.14591	6.386417E-02
13		387.4486								0.4432917
14		387.4486								
15		387.4486								
16		387.4486								
17		387.4486								
CFE			12.99777							
MAD			203.5221							
MSE			65396.17							
MAPE			43.14591							
Trk. Signal			6.386417E-02							
R-square			0.4432917							
Alpha			0.65							
Beta			0							
F(0)			379							
T(0)			0							

Gambar 9. Perhitungan Metode *Single Exponential Smoothing with Trend* (SEST)

Pada Gambar 9 diatas dapat dilihat bahwa perhitungan peramalan metode *Single Exponential Smoothing with Trend* (SEST) menggunakan software WinQSB menghasilkan nilai MAD = 203.5221, nilai MSE = 65396.17 dan nilai MAPE = 43.14591.



Gambar 10. Grafik Metode *Single Exponential Smoothing with Trend* (SEST)

Pada Gambar 10 diatas ini dapat dilihat grafik yang menunjukkan perbedaan antara volume *actual demand* (garis hitam) dengan volume *forecast demand* (garis biru) metode *single exponential smoothing with trend*.

## Lampiran 8

Peramalan menggunakan metode *Double Exponential Smoothing* (DES) *software* WinQSB.

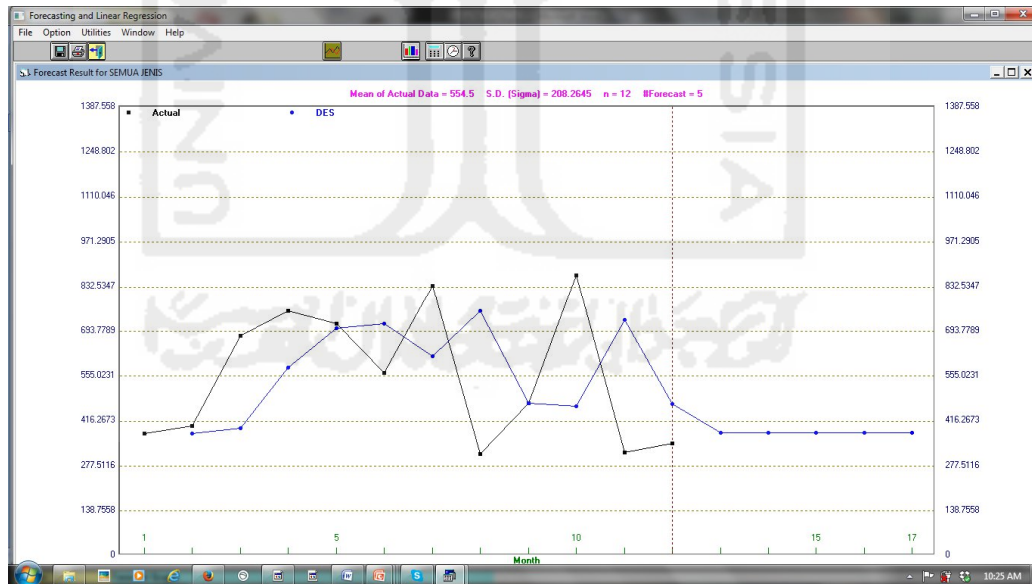
Forecast Result for SEMUA JENIS

12-09-2015 Month	Data	Actual DES	Forecast by Error	Forecast	CFE	MAD Signal	MSE	MAPE (%)	Tracking	R-square
1	379									
2	401	379	22	22	484	5.486284	1			
3	680	393.4342	286.5658	308.5658	154.2829			41301.99	23.81416	2
4	756	581.9709	174.0291	482.5949	160.865	37630.04		23.54935		3
5	716	702.9575	13.04254	495.6375	123.9094	27165.14		28265.05	18.11741	4
6	565	715.8823	-150.8823	344.7552	129.304			19.83489		
7	896	617.3552	278.6448	563.4	144.1941	30605.21		20.88803		
8	315	757.251	-442.251	121.149	186.7737	54173.89		37.96076	0.6486406	0.6445018
9	472	472.1407	-0.1407471	121.0082	163.4445	47402.16		33.21939	0.7403626	0.6516579
10	868	461.7559	406.2441	527.2523	190.4223	60472.39		34.7286	2.768858	0.6419639
11	319	727.9174	-408.9174	118.3349	212.2718	71146.5	44.07447	0.5574688		0.4902174
12	347	469.2355	-122.2355	-3.900574	204.0867	66036.95		43.2701	-1.911234E-02	0.451943
13		379.6984								
14		379.6984								
15		379.6984								
16		379.6984								
17		379.6984								

CFE -3.900574  
MAD 204.0867  
MSE 66036.95  
MAPE 43.2701  
Trk.Signal -1.911234E-02  
R-square 0.451943  
Alpha=0.81  
F(0)=379  
F'(0)=379

Gambar 11. Perhitungan Metode *Double Exponential Smoothing* (DES)

Pada Gambar 11 diatas dapat dilihat bahwa perhitungan peramalan metode *Double Exponential Smoothing* (DES) menggunakan *software* WinQSB menghasilkan nilai MAD = 204.0867, nilai MSE = 66036.95 dan nilai MAPE = 43.2701.



Gambar 12. Grafik Metode *Double Exponential Smoothing* (DES)

Pada Gambar 12 diatas ini dapat dilihat grafik yang menunjukkan perbedaan antara volume *actual demand* (garis hitam) dengan volume *forecast demand* (garis biru) metode *double exponential smoothing*.

## Lampiran 9

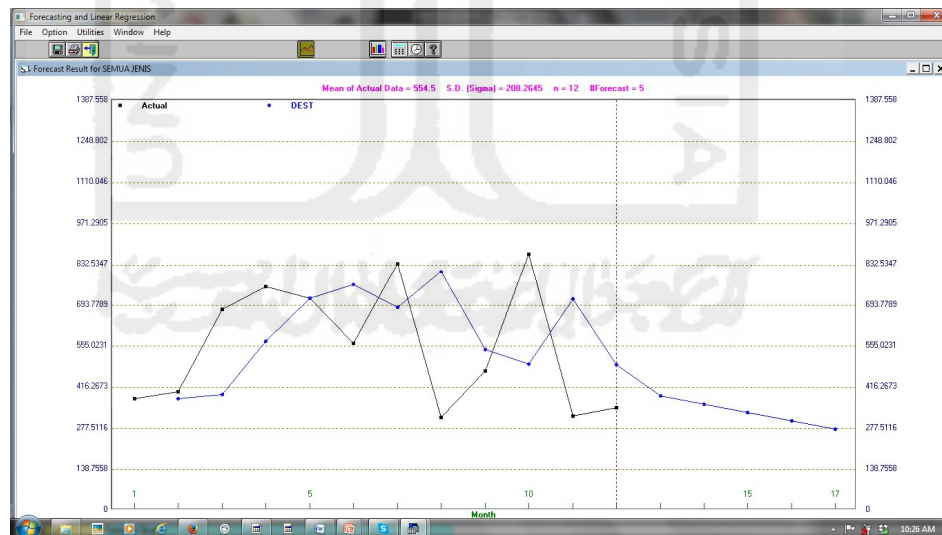
Peramalan menggunakan metode *Double Exponential Smoothing with Trend* (DEST) *software* WinQSB.

Forecast Result for SEMUA JENIS

12-09-2015 Month	Data	Actual DEST	Forecast by Error	Forecast	CFE	MAD Signal	MSE	MAPE (%)	Tracking	R-square
1	379									
2	401	379	22	22	484	5.486284	1			
3	680	392.64	287.36	309.36	154.68	41529.88	23.87255	2		
4	756	572.9174	183.0826	492.4426		164.1475	38859.66	23.98746	3	
5	716	716.1581	-0.1581421	492.2844		123.1502	29144.75	17.99612	3	0.997432
6	565	763.3839	-198.3839	293.9006		138.1969	31187.03	21.41933	2	1.2668
7	836	687.6945	148.3055	442.2061		139.8817	29654.95	20.80609	3	1.161287
8	315	807.8878	-492.8878	-50.6817		190.3111	60124	40.18698	-0.2663097	0.8225116
9	472	544.7935	-72.79346	-123.4752		175.6214	53270.86	37.0914	-0.7030758	0.7907135
10	868	494.791	373.209	249.7339		197.5756	62827.99	37.74751	1.263991	0.669943
11	319	714.3146	-395.3146	-145.5808		217.3495	72172.55	46.36507	-0.6698004	0.5466687
12	347	493.219	-146.219	-291.7998		210.8831	67555.05	45.9808	-1.383704	0.5183468
13		388.5729								
14		360.531								
15		332.4891								
16		304.4471								
17		276.4052								
CFE					-291.7998					
MAD					210.8831					
MSE					67555.05					
MAPE					45.9808					
Trk.Signal					-1.383704					
R-square					0.5183468					
Alpha=0.31										
F(0)=379										
F'(0)=379										

Gambar 13. Perhitungan Metode *Double Exponential Smoothing with Trend* (DEST)

Pada Gambar 13 diatas dapat dilihat bahwa perhitungan peramalan metode *Double Exponential Smoothing with Trend* (DEST) menggunakan *software* WinQSB menghasilkan nilai MAD = 210.8831, nilai MSE = 67555.05 dan nilai MAPE = 45.9808.



Gambar 14. Grafik Metode *Double Exponential Smoothing with Trend* (DEST)

Pada Gambar 14 diatas ini dapat dilihat grafik yang menunjukkan perbedaan antara volume *actual demand* (garis hitam) dengan volume *forecast demand* (garis biru) metode *double exponential smoothing with trend*.

Lampiran 10

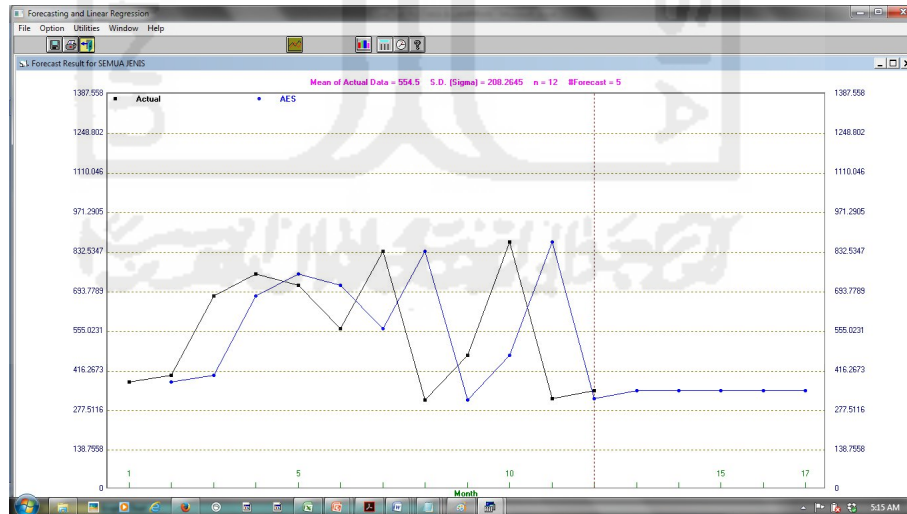
Peramalan menggunakan metode *Adaptive Exponential Smoothing* (AES) *software* WinQSB.

Forecast Result for SEMUA JENIS

12-09-2015 Month	Data	Actual AES	Forecast by Error	Forecast	CFE	MAD Signal	MSE	MAPE (%)	Tracking	R-square
1	379									
2	401	379	22	22	484	5.486284	1			
3	680	401	279	301	150.5	39162.5	23.25785	2		
4	756	680	76	377	125.6667	28033.67	18.8562	3		
5	716	756	-40	337	104.25	21425.25	15.5388	3.232614		
6	565	716	-151	186	113.6	21700.4	17.77617	1.637324		
7	836	565	271	457	139.8333	30323.83	20.21619	3.268177		
8	315	836	-521	-64	194.2857	64769.14	40.95628	-0.3294117	0.847935	
9	472	315	157	93	189.625	59754.13	39.99459	0.4904417		
10	868	472	396	489	212.5556	70538.78	40.61987	2.300575	0.9991102	
11	319	868	-549	-60	246.2	93625	53.76791	-0.2437043	0.9247124	
12	347	319	28	-32	226.3636	85184.91	49.61348	-0.1413655	0.9700639	
13	347									
14	347									
15	347									
16	347									
17	347									
CFE		-32								
MAD		226.3636								
MSE		85184.91								
MAPE		49.61348								
Trk. signal		-0.1413655								
R-square		0.9700639								
Alpha=1										
Beta=379										
F(0)=0										

Gambar 15. Perhitungan Metode *Adaptive Exponential Smoothing* (AES)

Pada Gambar 15 diatas dapat dilihat bahwa perhitungan peramalan metode *Adaptive Exponential Smoothing* (AES) menggunakan *software* WinQSB menghasilkan nilai MAD = 226.3636, nilai MSE = 85184.91 dan nilai MAPE = 49.61348.



Gambar 16. Grafik Metode *Adaptive Exponential Smoothing* (AES)

Pada Gambar 16 diatas ini dapat dilihat grafik yang menunjukkan perbedaan antara volume *actual demand* (garis hitam) dengan volume *forecast demand* (garis biru) metode *adaptive exponential smoothing*.

Lampiran 11

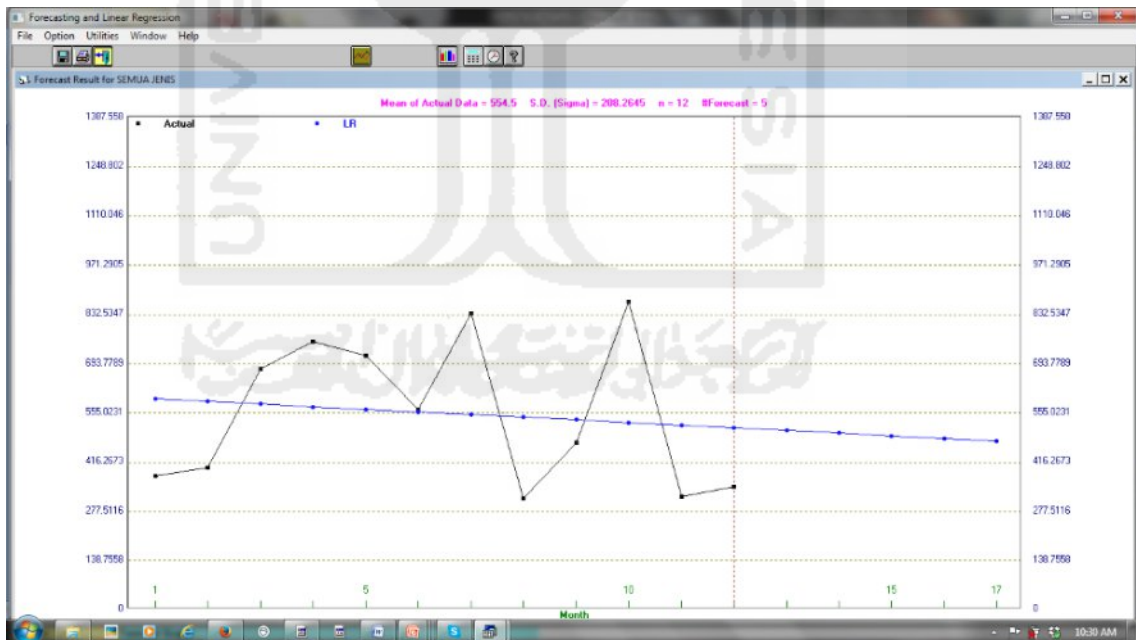
Peramalan menggunakan metode *Linear Regression with Time* (LR) software WinQSB.

Forecast Result for SEMUA JENIS

12-09-2015	Actual	Forecast by	Forecast	CFE	MAD	MSE	MAPE (%)	Tracking	R-square
Month	Data	LR	Error		Signal				
1	379	595.3846	-216.3846	-216.3846	216.3846				-1
2	401	587.951	-186.951	-403.3356	201.6678	40886.49	46822.29	51.85738	
3	680	580.5175	99.48254	-303.8531	167.6061		30556.59	39.44818	-1.8129 0.5485139
4	756	573.0839	182.9161	-120.937	171.4336		31282.01	35.63495	-0.7054453 3.552151E-02
5	716	565.6503	150.3497	29.41266	167.2168		29546.62	32.70767	0.1758954 5.509114E-03
6	565	558.2168	6.783203	36.19586	140.4779		24629.85	27.45648	0.2576624 8.973879E-03
7	896	550.7832	285.2168	321.4127	161.1549		32732.53	28.40796	1.994434 8.718071E-02
8	315	543.3497	-228.3497	93.06299	169.5542		35158.91	33.91846	0.5486687 1.270445E-02
9	472	535.9161	-63.91608	29.14691	157.8166		31706.28	31.65436	0.1846885 1.224576E-02
10	868	528.4825	339.5175	368.6644	175.9867		40062.87	32.40042	2.094842 5.056113E-02
11	319	521.049	-202.049	166.6155	178.356	40132.04	35.21295	0.9341736	0.0199981
12	347	513.6154	-166.6154	1.220703E-04	177.3776		39101.09	36.27987	6.881945E-07 0.0165618
13		506.1818							
14		498.7482							
15		491.3147							
16		483.8811							
17		476.4475							
CFE		1.220703E-04							
MAD		177.3776							
MSE		39101.09							
MAPE		36.27987							
Trk. Signal		6.881945E-07							
R-square		0.0165618							
		Y-intercept=602.8182							
		Slope=-7.4336							

Gambar 17. Perhitungan Metode *Linear Regression with Time* (LR)

Pada Gambar 17 diatas dapat dilihat bahwa perhitungan peramalan metode *Linear Regression with Time* (LR) menggunakan software WinQSB menghasilkan nilai MAD = 177.3776, nilai MSE = 39101.09 dan nilai MAPE = 36.27987.



Gambar 18. Grafik Metode *Linear Regression with Time* (LR)

Pada Gambar 18 diatas ini dapat dilihat grafik yang menunjukkan perbedaan antara volume *actual demand* (garis hitam) dengan volume *forecast demand* (garis biru) metode *linear regression with time*.

Lampiran 12

Peramalan menggunakan metode *Holt – Winters Additive Algorithm* (HWA) software WinQSB.

Forecast Result for SEMUA DENIS

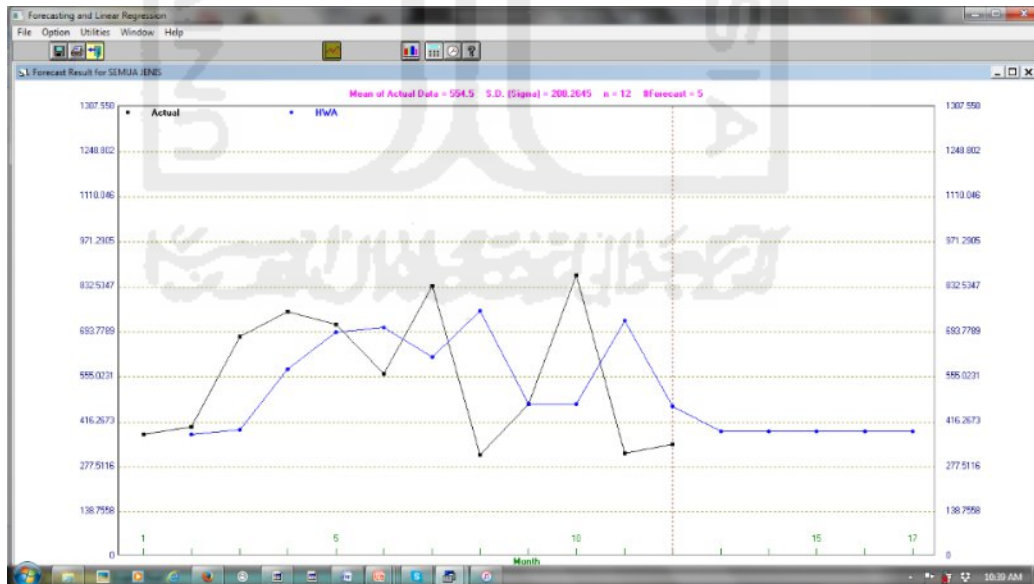
12-09-2015	Actual	Forecast by	Forecast	CFE	MAD	MSE	MAPE (%)	Tracking	R-square
Month	Data	HWA	Error		Signal				
1	379								
2	401	379	22	22	484	5.486284	1		
3	680	393.2076	286.7924	308.7924	154.3962		41366.95	23.83082	2
4	756	578.4181	177.5819	486.3743	162.1248		38089.74	23.7171	3
5	716	693.1005	22.89954	509.2739	127.3185		28698.4	18.58739	4
6	565	707.889	-142.889	366.3849	130.4326		27042.18	19.92793	2.808998
7	836	615.6113	220.3887	586.7736	145.4252		30630.34	21.00032	4.034881
8	315	757.9383	-442.9383	143.8353	187.9271		54282.34	38.08818	0.7653779
9	472	471.8888	0.1112061	143.9465	164.4501		47497.05	33.3501	0.87532
10	868	471.9606	396.0394	539.9838	190.1823		59647.06	34.69639	2.839307
11	319	727.7228	-408.7228	131.2631	212.0363		70387.79	44.03938	0.6190593
12	347	463.7697	-116.7697	14.49338	203.3757		65228.46	43.095	7.126404E-02
13		388.3598							0.4391861
14		388.3598							
15		388.3598							
16		388.3598							
17		388.3598							

CFE 14.49338  
MAD 203.3757  
MSE 65228.46  
MAPE 43.095  
Trk. Signal 7.126404E-02  
R-square 0.4391861

C=1  
Alpha=0.23  
Beta=0  
Gamma=0.54  
F(0)=379  
T(0)=0  
s(1)=0

Gambar 19. Perhitungan Metode *Holt – Winters Additive Algorithm* (HWA)

Pada Gambar 19 diatas dapat dilihat bahwa perhitungan peramalan metode *Holt – Winters Additive Algorithm* (HWA) menggunakan software WinQSB menghasilkan nilai MAD = 203.3757, nilai MSE = 65228.46, dan nilai MAPE = 43.095.



Gambar 20. Grafik Metode *Holt – Winters Additive Algorithm* (HWA)

Pada Gambar 20 diatas ini dapat dilihat grafik yang menunjukkan perbedaan antara volume *actual demand* (garis hitam) dengan volume *forecast demand* (garis biru) metode *holt – winters additive algorithm*.



## Lampiran 13

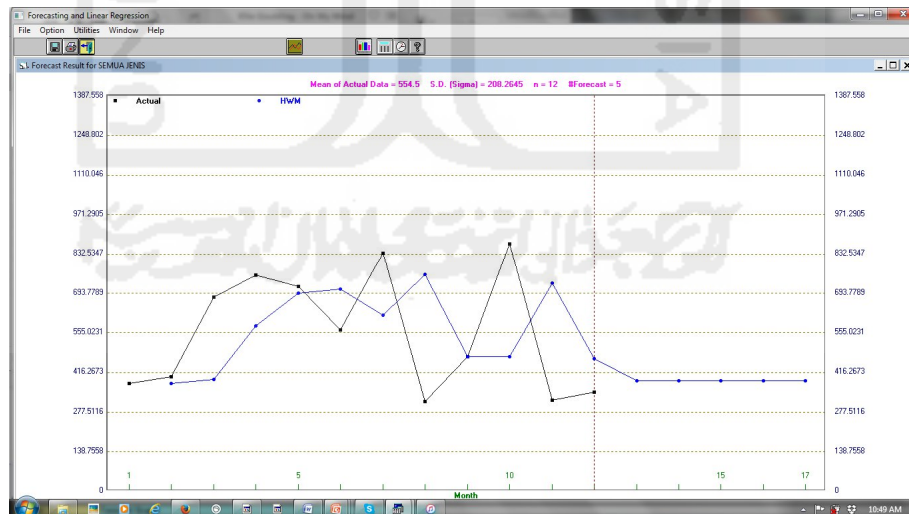
Peramalan menggunakan metode *Holt – Winters Multiplicative Algorithm* (HWM) *software* WinQSB.

Forecast Result for SEMUA JENIS

12-09-2015	Actual	Forecast by	Forecast	CFE	MAD	MSE	MAPE (%)	Tracking	R-square
Month	Data	HWM	Error		Signal				
1	379								
2	401	379	22	22	22	484	5.486284	1	
3	680	393.2076	286.7924	308.7924	154.3962	41366.95		23.83082	2
4	756	578.4181	177.5819	486.3743	162.1248	38089.74		23.7171	3
5	716	693.1005	22.89954	509.2739	127.3185	28698.4	18.58739	4	
6	565	707.889	-142.889	366.3849	130.4326	27042.18	19.92793	2.808998	
7	836	615.6113	220.3887	586.7736	145.4252	30630.34		21.00032	4.034881
8	315	757.9383	-442.9383	143.8353	187.9271	54282.34		38.08818	0.7637779
9	472	471.8888	0.1112061	143.9465	164.4501	47497.05		33.3301	0.87532
10	868	471.9606	396.0394	539.9858	190.1823	59647.07		34.69639	2.839307
11	319	727.7228	-408.7228	131.2631	212.0363	70387.79		44.03938	0.6190593
12	347	463.7697	-116.7697	14.49338	203.3757	65228.46		43.095	7.126404E-02
13	388.3599								0.4391861
14	388.3599								
15	388.3599								
16	388.3599								
17	388.3599								
CFE		14.49338							
MAD		203.3757							
MSE		65228.46							
MAPE		43.095							
Trk.signal		7.126404E-02							
R-square		0.4391861							
c=1									
Alpha=0.23									
Beta=0									
Gamma=0.54									
F(0)=379									
T(0)=0									
S(1)=1									

Gambar 21. Perhitungan Metode *Holt – Winters Multiplicative Algorithm* (HWM)

Pada Gambar 21 diatas dapat dilihat bahwa perhitungan peramalan metode *Holt – Winters Multiplicative Algorithm* (HWM) menggunakan *software* WinQSB menghasilkan nilai MAD = 203.3757, nilai MSE = 65228.46, dan nilai MAPE = 43.095.



Gambar 22. Grafik Metode *Holt – Winters Multiplicative Algorithm* (HWM)

Pada Gambar 22 diatas ini dapat dilihat grafik yang menunjukkan perbedaan antara volume *actual demand* (garis hitam) dengan volume *forecast demand* (garis biru) metode *holt – winters multiplicative algorithm*.

Lampiran 14

Pada Tabel 3 dibawah ini diberikan peramalan menggunakan metode *Centered Moving Average* (CMA) dengan 5 periode peramalan.

Tabel 3. Peramalan metode *Centered Moving Average*

Periode	Demand	Peramalan	FE	Abs FE	Kesalahan % Abs	Kesalahan Kuadrat
n	Xi	Fi	Xi - Fi	(Xi - Fi)	$((Xi - Fi)/Xi)100$	$(Xi - Fi)^2$
1	379					
2	401					
3	680	586.40	93.60	93.6	13.76	8760.96
4	756	623.60	132.40	132.4	17.51	17529.76
5	716	710.60	5.40	5.4	0.75	29.16
6	565	637.60	-72.60	72.6	12.85	5270.76
7	836	580.80	255.20	255.2	30.53	65127.04
8	315	611.20	-296.20	296.2	94.03	87734.44
9	472	562.00	-90.00	90	19.07	8100.00
10	868	464.20	403.80	403.8	46.52	163054.44
11	319	464.20	-145.20	145.2	45.52	21083.04
12	347	464.20	-117.20	117.2	33.78	13735.84
<b>Total</b>			<b>169.20</b>	<b>1611.60</b>	<b>314.32</b>	<b>390425.44</b>
				<b>161.16</b>	<b>31.43</b>	<b>39042.54</b>
				<b>MAD</b>	<b>MAPE</b>	<b>MSE</b>

Sumber : data diolah.

Pada Gambar 21 diatas dapat dilihat bahwa perhitungan peramalan metode *Centered Moving Average* (CMA) dengan 5 periode peramalan menghasilkan nilai MAD = 161.16, nilai MSE = 39042.54, dan nilai MAPE = 31.43.



No	Model Kayu	Jenis Produk	Periode (bulan)												Total Persediaan per Model
			1	2	3	4	5	6	7	8	9	10	11	12	
			Nov '14	Des '14	Jan '15	Feb '15	Mar '15	Apr '15	Mei '15	Jun '15	Jul '15	Agt '15	Sep '15	Okt '15	
4	HSL	SC 43	12	124	6	107	30	45	1	20	20	60	43	40	508
5	Fiber	SC 07	18	0	30	10	1	0	40	0	0	10	0	0	109
		SC 49													
6	SLJ	SC 11	31	56	40	40	33	28	43	35	31	43	0	25	405
		SC 12													
		SC 35													
		SC 40													
		SC 42													
		SC 63													
		SC 64													
		SC 83													
		SC 91													
		SC 13													
7	DTN	SC 14	10	8	22	18	89	0	18	18	0	44	36	0	263
		SC 30													
		SC 32													
		SC 33													
		SC 60													
8	JND	SC 15	12	2	0	14	11	2	9	0	0	45	7	39	141
		SC 16													
		SC 29													

No	Model Kayu	Jenis Produk	Periode (bulan)												Total Persediaan per Model
			1	2	3	4	5	6	7	8	9	10	11	12	
			Nov '14	Des '14	Jan '15	Feb '15	Mar '15	Apr '15	Mei '15	Jun '15	Jul '15	Agt '15	Sep '15	Okt '15	
		SC 74													
		SC 17													
		SC 31													
9	SL	SC 59	0	0	0	1	2	1	29	0	0	49	12	0	94
		SC 86													
		SC 88													
10	SL Hak	SC 25	8	0	15	0	0	0	0	0	0	0	0	0	23
		SC 26													
		SC 34													
		SC 36													
11	BKP	SC 37	40	0	0	27	4	8	5	0	0	0	14	43	141
		SC 52													
		SC 70													
		SC 80													
12	MTHR	SC 38	20	40	39	40	55	46	42	52	18	2	43	46	443
		SC 39													
		SC 48													
13	JND BL	SC 62	19	66	40	40	20	41	20	46	43	91	45	0	471
		SC 84													
		SC 96													
14	Eks	SC 41	50	1	20	29	0	40	20	0	0	0	0	0	160



No	Model Kayu	Jenis Produk	Periode (bulan)												Total Persediaan per Model
			1	2	3	4	5	6	7	8	9	10	11	12	
			Nov '14	Des '14	Jan '15	Feb '15	Mar '15	Apr '15	Mei '15	Jun '15	Jul '15	Agt '15	Sep '15	Okt '15	
21	CTR	SC 61	0	32	0	0	50	0	50	0	0	80	0	23	235
22	Roda	SC 81	0	0	32	0	20	0	60	0	40	0	0	0	152
		SC 95													
23	CKS	SC 85	27	0	0	0	0	0	20	0	0	50	0	0	97
24	KJG	SC 97	50	0	50	56	49	0	0	0	0	0	0	0	205
25	TK	SC 71	29	0	68	20	0	5	0	20	23	0	0	6	171
		SC 72													
		SC 77													
		SC 78													
26	WED LKEN	SC 69	34	40	43	21	99	144	72	40	65	21	50	0	629
		SC 82													
27	WED	SC 98	0	33	30	20	12	40	0	0	52	18	2	0	207
28	MTHR	SC 75	0	23	9	0	25	0	20	18	0	0	0	0	95
	BR	SC 76													
29	Hak Q	Hak Q	20	0	20	10	0	0	0	0	0	0	0	0	50
Total Persediaan per Periode (bulan)			631	726	696	763	885	586	840	347	486	933	476	594	7963

Sumber : data diolah.