Penentuan Stasioner dan Non Stasioner S20

Bln	dt (unit)
1	1107
2	1491
3	1774
4	1540
5	2080
6	1751
7	1728
8	2104
9	1753
10	1934
11	2246
12	1885

Perhitungan :

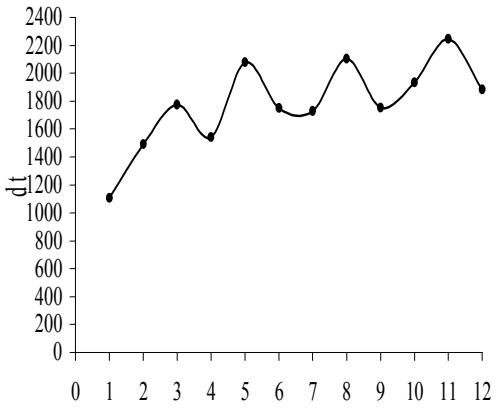
$\mu = 1782.75$

$\sigma = 308.242$

$cv = \sigma / \mu$

$= 0.173$

$0.173 <= 0.2$ (Peramalan Stasioner)



Permintaan S20

Penentuan Stasioner dan Non Stasioner S50

Bln	dt (unit)
1	509
2	450
3	510
4	425
5	614
6	560
7	559
8	697
9	575
10	669
11	715
12	713

Perhitungan :

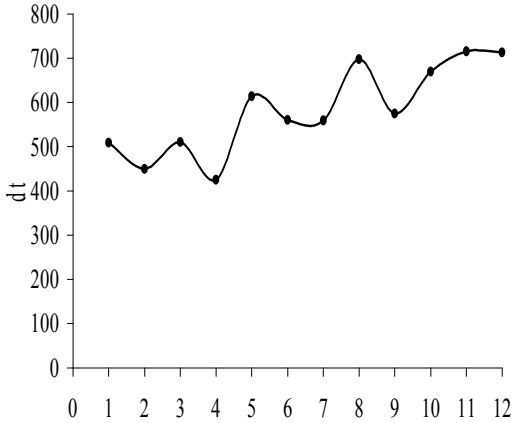
$\mu = 583$

$\sigma = 100.14$

$cv = \sigma / \mu$

$= 0.172$

$0.172 <= 0.2$ (Peramalan Stasioner)



Permintaan S50

Penentuan Stasioner dan Non Stasioner S100

Bln	dt (unit)
1	208
2	196
3	251
4	200
5	234
6	197
7	191
8	280
9	249
10	321
11	281
12	326

Perhitungan :

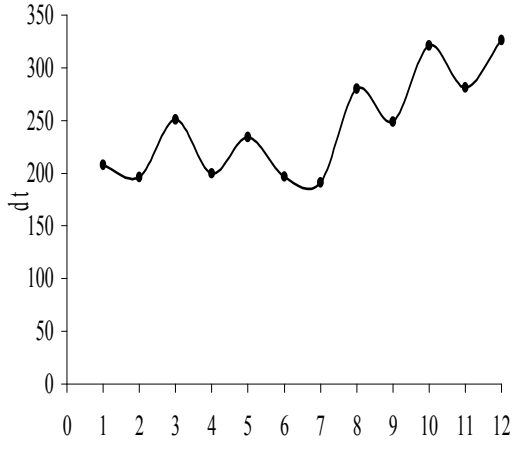
$\mu = 244.5$

$\sigma = 48.66$

$cv = \sigma / \mu$

0.199

0.199 <= 0.2 (Peramalan Stasioner)



Permintaan S100

Penentuan Stasioner dan Non Stasioner S150

Bln	dt (unit)
1	115
2	147
3	147
4	204
5	167
6	124
7	144
8	224
9	135
10	187
11	176
12	250

Perhitungan :

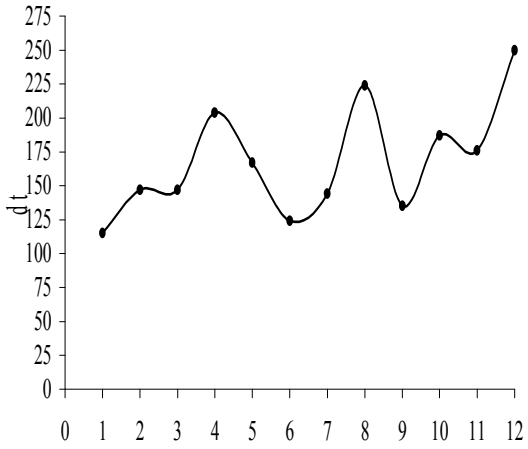
$\mu = 168.33$

$\sigma = 41.42$

$cv = \sigma / \mu$

= 0.246

0.246 > 0.2 (Peramalan Non Stasioner)



Permintaan S150

Penentuan Stasioner dan Non Stasioner AS5

Bln	dt (unit)
1	129
2	146
3	196
4	127
5	221
6	165
7	208
8	216
9	174
10	200
11	186
12	163

Perhitungan :

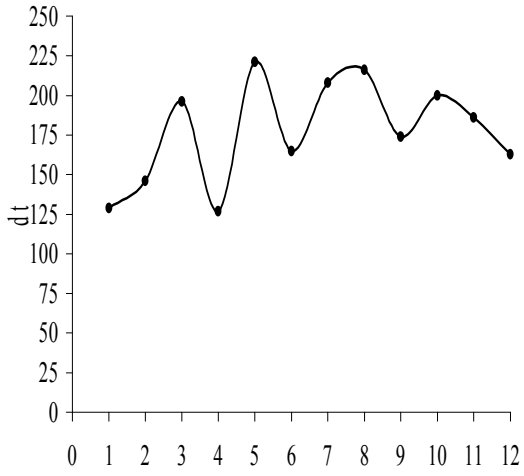
μ = 177.58

σ = 32.33

cv = σ / μ

= 0.182

0.182 <= 0.2 (Peramalan Stasioner)



Permintaan AS5

Penentuan Stasioner dan Non Stasioner AS10

Bln	dt (unit)
1	217
2	247
3	243
4	226
5	319
6	269
7	258
8	346
9	286
10	338
11	323
12	331

Perhitungan :

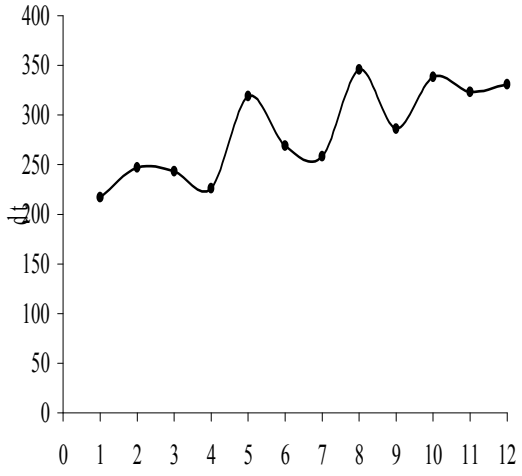
μ = 283.58

σ = 46.24

cv = σ / μ

= 0.163

0.163 <= 0.2 (Peramalan Stasioner)



Permintaan AS10

Penentuan Stasioner dan Non Stasioner AS25

Bln	dt (unit)
1	178
2	182
3	226
4	190
5	274
6	217
7	249
8	275
9	242
10	312
11	287
12	315

Perhitungan :

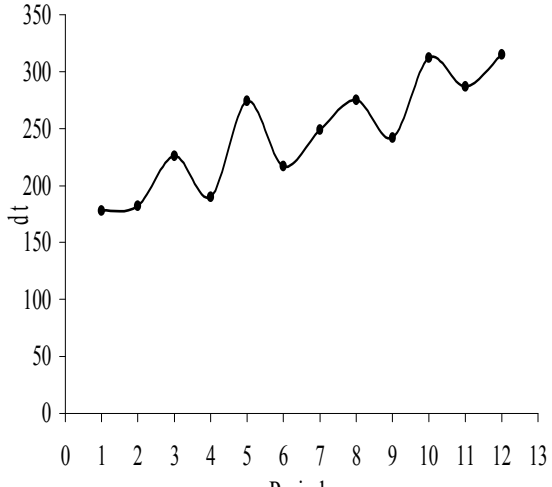
μ = 245.58

σ = 48.19

cv = σ / μ

= 0.196

0.196 <= 0.2 (Peramalan Stasioner)



Permintaan AS25

Penentuan Stasioner dan Non Stasioner AS50

Bln	dt (unit)
1	102
2	140
3	190
4	138
5	163
6	119
7	139
8	189
9	177
10	189
11	155
12	190

Perhitungan :

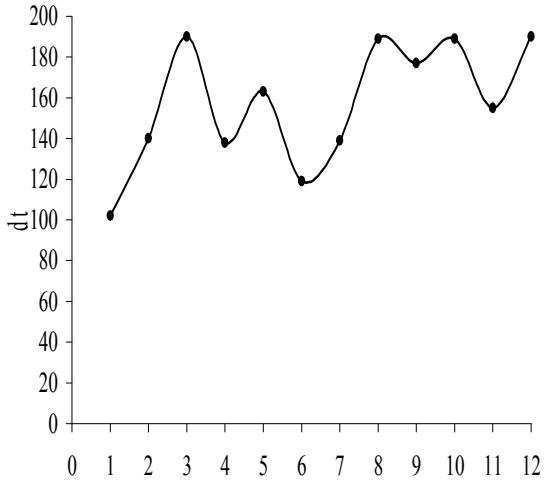
μ = 157.58

σ = 30.31

cv = σ / μ

= 0.192

0.198 <= 0.2 (Peramalan Stasioner)



Permintaan AS50

Peramalan S20

Konstan

Bln	dt (#)	dt^I	$\lvert dt - dt^I \rvert$
1	1107	1782.75	675.75
2	1491	1782.75	291.75
3	1774	1782.75	8.75
4	1540	1782.75	242.75
5	2080	1782.75	297.25
6	1751	1782.75	31.75
7	1728	1782.75	54.75
8	2104	1782.75	321.25
9	1753	1782.75	29.75
10	1934	1782.75	151.25
11	2246	1782.75	463.25
12	1885	1782.75	102.25
	21393		2670.5

dt^I = 21393/ 12

dt^I = 1782.75

MAE = 2670.5 / 12

MAE = 222.54

Peramalan S20

SMA (n = 2)

Bln	dt (#)	dt^I	$\lvert dt - dt^I \rvert$
1	1107	-	-
2	1491	-	-
3	1774	1299	475
4	1540	1632.5	92.5
5	2080	1657	423
6	1751	1810	59
7	1728	1915.5	187.5
8	2104	1739.5	364.5
9	1753	1916	163
10	1934	1928.5	5.5
11	2246	1843.5	402.5
12	1885	2090	205
			2377.5

dt^I = (1107+1491) / 2

dt^I = 1299

MAE = 2377.5 / 10

MAE = 237.75

Peramalan S20

SES (α = 0.2 n = 2)

Bln	dt (#)	dt^I	$\lvert dt - dt^I \rvert$
1	1107	-	-
2	1491	1107	384
3	1774	1183.8	590.2
4	1540	1301.84	238.16
5	2080	1349.47	730.53
6	1751	1495.58	255.42
7	1728	1546.66	181.34
8	2104	1582.93	521.07
9	1753	1687.14	65.86
10	1934	1700.31	233.69
11	2246	1747.05	498.95
12	1885	1846.84	38.16
			3737.37

$dt^I = \alpha(d_{t-1}) + (1-\alpha)(d_{t-1}^I)$

$dt^I 2 = 0.2(1107) + (1-0.2)(1107)$

$dt^I 2 = 1107$

$dt^I 4 = 0.2(1774) + 0.8(1183.8)$

$dt^I 4 = 1301.84$

MAE = 3737.37 / 11

MAE = 339.76

Peramalan S20

WMA (2)

Bln	dt (#)	dt^I	$\lvert dt - dt^I \rvert$
1	1107	-	-
2	1491	-	-
3	1774	1363	411
4	1540	1679.67	139.67
5	2080	1618	462
6	1751	1900	149
7	1728	1860.67	132.67
8	2104	1735.67	368.33
9	1753	1978.67	225.67
10	1934	1870	64
11	2246	1873.67	372.33
12	1885	2142	257
			2581.67

Koefisien pembobot = 2+1 = 3

dt^I = (1*(1107)+2*(1491)) / 3

dt^I = 1363

MAE = 2581.67 / 10

MAE = 258.17

Peramalan

Spt 50

Konstan

Bln	dt (#)	dt^I	$\lvert dt - dt^I \rvert$
1	509	583	74
2	450	583	133
3	510	583	73
4	425	583	158
5	614	583	31
6	560	583	23
7	559	583	24
8	697	583	114
9	575	583	8
10	669	583	86
11	715	583	132
12	713	583	130
	6996		986

MAE = 82.17

Peramalan

Spt 50

SMA (n = 2)

Bln	dt (#)	dt^I	$\lvert dt - dt^I \rvert$
1	509	-	-
2	450	-	-
3	510	479.5	30.5
4	425	480	55
5	614	467.5	146.5
6	560	519.5	40.5
7	559	587	28
8	697	559.5	137.5
9	575	628	53
10	669	636	33
11	715	622	93
12	713	692	21
			638

MAE = 63.8

Peramalan

Spt 50

SES (α = 0.2 n = 2)

Bln	dt (#)	dt^I	$\lvert dt - dt^I \rvert$
1	509	-	-
2	450	509	59
3	510	497.2	12.8
4	425	499.76	74.76
5	614	484.81	129.19
6	560	510.65	49.35
7	559	520.52	38.48
8	697	528.21	168.79
9	575	561.97	13.03
10	669	564.58	104.42
11	715	585.46	129.54
12	713	611.37	101.63
			881

MAE = 80.09

Peramalan

Spt 50

WMA (2)

Bln	dt (#)	dt^I	$\lvert dt - dt^I \rvert$
1	509	-	-
2	450	-	-
3	510	469.67	40.33
4	425	490	65
5	614	453.33	160.67
6	560	551	9
7	559	578	19
8	697	559.33	137.67
9	575	651	76
10	669	615.67	53.33
11	715	637.67	77.33
12	713	699.67	13.33
			651.67

MAE = 65.17

Peramalan

Spt 100

Konstan

Bln	dt (#)	dt^{I}	$\lvert dt - dt^{I} \rvert$
1	208	244.5	36.5
2	196	244.5	48.5
3	251	244.5	6.5
4	200	244.5	44.5
5	234	244.5	10.5
6	197	244.5	47.5
7	191	244.5	53.5
8	280	244.5	35.5
9	249	244.5	4.5
10	321	244.5	76.5
11	281	244.5	36.5
12	326	244.5	81.5
	2934		482

MAE = 40.17

Peramalan

Spt 100

SMA (n = 2)

Bln	dt (#)	dt^{I}	$\lvert dt - dt^{I} \rvert$
1	208	-	-
2	196	-	-
3	251	202	49
4	200	223.5	23.5
5	234	225.5	8.5
6	197	217	20
7	191	215.5	24.5
8	280	194	86
9	249	235.5	13.5
10	321	264.5	56.5
11	281	285	4
12	326	301	25
			310.5

MAE = 31.05

Peramalan

Spt 100

SES (α = 0.2 n = 2)

Bln	dt (#)	dt^{I}	$\lvert dt - dt^{I} \rvert$
1	208	-	-
2	196	208	12
3	251	205.6	45.4
4	200	214.68	14.68
5	234	211.74	22.26
6	197	216.2	19.20
7	191	212.36	21.36
8	280	208.08	71.92
9	249	222.47	26.53
10	321	227.77	93.23
11	281	246.42	34.58
12	326	253.34	72.66
			433.81

MAE = 39.44

Peramalan

Spt 100

WMA (2)

Bln	dt (#)	dt^{I}	$\lvert dt - dt^{I} \rvert$
1	208	-	-
2	196	-	-
3	251	200	51
4	200	232.67	32.67
5	234	217	17
6	197	222.67	25.67
7	191	209.33	18.33
8	280	193	87
9	249	250.33	1.33
10	321	259.33	61.67
11	281	297	16
12	326	294.33	31.67
			342.33

MAE = 34.23

Peramalan

AS 5

Konstan

Bln	dt (#)	dt^{I}	$\lvert dt - dt^{I} \rvert$
1	129	177.58	48.58
2	146	177.58	31.58
3	196	177.58	18.42
4	127	177.58	50.58
5	221	177.58	43.42
6	165	177.58	12.58
7	208	177.58	30.42
8	216	177.58	38.42
9	174	177.58	3.58
10	200	177.58	22.42
11	186	177.58	8.42
12	163	177.58	14.58
	2131		323

MAE = 26.92

Peramalan

AS 5

SMA (n = 2)

Bln	dt (#)	dt^{I}	$\lvert dt - dt^{I} \rvert$
1	129	-	-
2	146	-	-
3	196	137.5	58.5
4	127	171	44
5	221	161.5	59.5
6	165	174	9
7	208	193	15
8	216	186.5	29.5
9	174	212	38
10	200	195	5
11	186	187	1
12	163	193	30
			289.5

MAE = 28.95

Peramalan

AS 5

SES (α = 0.2 n = 2)

Bln	dt (#)	dt^{I}	$\lvert dt - dt^{I} \rvert$
1	129	-	-
2	146	129	17
3	196	132.4	63.6
4	127	145.12	18.12
5	221	141.496	79.5
6	165	157.3968	7.6
7	208	158.91744	49.08
8	216	168.733952	47.27
9	174	178.187162	4.19
10	200	177.349729	22.65
11	186	181.879783	4.12
12	163	182.703827	19.7
			332.84

MAE = 30.26

Peramalan

AS 5

WMA (2)

Bln	dt (#)	dt^{I}	$\lvert dt - dt^{I} \rvert$
1	129	-	-
2	146	-	-
3	196	140.33	55.67
4	127	179.33	52.33
5	221	150	71
6	165	189.67	24.67
7	208	183.67	24.33
8	216	193.67	22.33
9	174	213.33	39.33
10	200	188	12
11	186	191.33	5.33
12	163	190.67	27.67
			334.67

MAE = 33.47

Peramalan

AS 10

Konstan

Bln	dt (#)	dt^{I}	$\lvert dt - dt^{I} \rvert$
1	217	283.58	66.58
2	247	283.58	36.58
3	243	283.58	40.58
4	226	283.58	57.58
5	319	283.58	35.42
6	269	283.58	14.58
7	258	283.58	25.58
8	346	283.58	62.42
9	286	283.58	2.42
10	338	283.58	54.42
11	323	283.58	39.42
12	331	283.58	47.42
	3403		483

MAE = 40.25

Peramalan

AS 10

SMA (n = 2)

Bln	dt (#)	dt^{I}	$\lvert dt - dt^{I} \rvert$
1	217	-	-
2	247	-	-
3	243	232	11
4	226	245	19
5	319	234.5	84.5
6	269	272.5	3.5
7	258	294	36
8	346	263.5	82.5
9	286	302	16
10	338	316	22
11	323	312	11
12	331	330.5	0.5
			286

MAE = 28.6

Peramalan

AS 10

SES (α = 0.2 n = 2)

Bln	dt (#)	dt^{I}	$\lvert dt - dt^{I} \rvert$
1	217	-	-
2	247	217	30
3	243	223	20
4	226	227	1
5	319	227	92.2
6	269	245	23.76
7	258	250	8.01
8	346	252	94.41
9	286	270	15.53
10	338	274	64.42
11	323	286	36.54
12	331	294	37.23
			423.08

MAE = 38.46

Peramalan

AS 10

WMA (2)

Bln	dt (#)	dt^{I}	$\lvert dt - dt^{I} \rvert$
1	217	-	-
2	247	-	-
3	243	237	6
4	226	244.33	18.33
5	319	231.67	87.33
6	269	288	19
7	258	285.67	27.67
8	346	261.67	84.33
9	286	316.67	30.67
10	338	306	32
11	323	320.67	2.33
12	331	328	3
			310.67

MAE = 31.07

Peramalan

AS 25

Konstan

Bln	dt (#)	dt^{I}	$\lvert dt - dt^{I} \rvert$
1	178	245.58	67.58
2	182	245.58	63.58
3	226	245.58	19.58
4	190	245.58	55.58
5	274	245.58	28.42
6	217	245.58	28.58
7	249	245.58	3.42
8	275	245.58	29.42
9	242	245.58	3.58
10	312	245.58	66.42
11	287	245.58	41.42
12	315	245.58	69.42
	2947		477

MAE = 39.75

Peramalan

AS 25

SMA (n = 2)

Bln	dt (#)	dt^{I}	$\lvert dt - dt^{I} \rvert$
1	178	-	-
2	182	-	-
3	226	180	46
4	190	204	14
5	274	208	66
6	217	232	15
7	249	245.5	3.5
8	275	233	42
9	242	262	20
10	312	258.5	53.5
11	287	277	10
12	315	299.5	15.5
			285.5

MAE = 28.55

Peramalan

AS 25

SES (α = 0.2 n = 2)

Bln	dt (#)	dt^{I}	$\lvert dt - dt^{I} \rvert$
1	178	-	-
2	182	178	4
3	226	178.8	47.2
4	190	188.24	1.76
5	274	188.59	85.41
6	217	205.67	11.33
7	249	207.94	41.06
8	275	216.15	58.85
9	242	227.92	14.08
10	312	230.74	81.26
11	287	246.99	40.01
12	315	254.99	60.01
			444.97

MAE = 40.45

Peramalan

AS 25

WMA (2)

Bln	dt (#)	dt^{I}	$\lvert dt - dt^{I} \rvert$
1	178	-	-
2	182	-	-
3	226	180.67	45.33
4	190	211.33	21.33
5	274	202	72
6	217	246	29
7	249	236	13
8	275	238.33	36.67
9	242	266.33	24.33
10	312	253	59
11	287	288.67	1.67
12	315	295.33	19.67
			322

MAE = 32.2

Peramalan

AS 50

Konstan

Bln	dt (#)	dt^I	$\lvert dt - dt^I \rvert$
1	102	157.58	55.58
2	140	157.58	17.58
3	190	157.58	32.42
4	138	157.58	19.58
5	163	157.58	5.42
6	119	157.58	38.58
7	139	157.58	18.58
8	189	157.58	31.42
9	177	157.58	19.42
10	189	157.58	31.42
11	155	157.58	2.58
12	190	157.58	32.42
	1891		305

MAE = 25.42

Peramalan

AS 50

SMA (n = 2)

Bln	dt (#)	dt^I	$\lvert dt - dt^I \rvert$
1	102	-	-
2	140	-	-
3	190	121	69
4	138	165	27
5	163	164	1
6	119	150.5	31.5
7	139	141	2
8	189	129	60
9	177	164	13
10	189	183	6
11	155	183	28
12	190	172	18
			255.5

MAE = 25.55

Peramalan

AS 50

SES (α = 0.2 n = 2)

Bln	dt (#)	dt^I	$\lvert dt - dt^I \rvert$
1	102	-	-
2	140	102	38
3	190	109.6	80.4
4	138	125.68	12.32
5	163	128.14	34.86
6	119	135.12	16.12
7	139	131.89	7.11
8	189	133.31	55.69
9	177	144.45	32.55
10	189	150.96	38.04
11	155	158.57	3.57
12	190	157.85	32.15
			350.79

MAE = 31.89

Peramalan

AS 50

WMA (2)

Bln	dt (#)	dt^I	$\lvert dt - dt^I \rvert$
1	102	-	-
2	140	-	-
3	190	127.33	62.67
4	138	173.33	35.33
5	163	155.33	7.67
6	119	154.67	35.67
7	139	133.67	5.33
8	189	132.33	56.67
9	177	172.33	4.67
10	189	181	8
11	155	185	30
12	190	166.33	23.67
			269.67

MAE = 26.97

Peramalan Linier S150

Bln	dt (unit)	dt . t	t^2	dt'	$\lvert dt - dt' \rvert$
1	115	115	1	132.34	17.34
2	147	294	4	138.89	8.11
3	147	441	9	145.44	1.56
4	204	816	16	151.99	52.01
5	167	835	25	158.54	8.46
6	124	744	36	165.09	41.09
7	144	1008	49	171.64	27.64
8	224	1792	64	178.19	45.81
9	135	1215	81	184.74	49.74
10	187	1870	100	191.29	4.29
11	176	1936	121	197.84	21.84
12	250	3000	144	204.39	45.61
78	**2020**	**14066**	**650**		**323.50**

$$b=\frac{N\sum dt.\,t-\sum dt\ \sum t}{N\sum t^2-(\sum t)^2}=\frac{(12\ x\ 14066)-(2020\ x78)}{(12\ x\ 650)-(78)^2}=6.55$$

$$a=\frac{\sum dt-b\sum t}{N}=\frac{2020-(6.55\ \ x78)}{12}=125.79$$

dt ' = a + b t = 125.79 + 6.55 t

MAE = 26.96

Peramalan Siklis S150

Bln	dt (unit)	Cos90t	Sin90t	$(Cos90t)^2$	$(Sin90t)^2$	dt.Cos90t	dt.Sin90t	Sin90t.Cos90t
1	115	0	1	0	1	0	115	0
2	147	-1	0	1	0	-147	0	0
3	147	0	-1	0	1	0	-147	0
4	204	1	0	1	0	204	0	0
5	167	0	1	0	1	0	167	0
6	124	-1	0	1	0	-124	0	0
7	144	0	-1	0	1	0	-144	0
8	224	1	0	1	0	224	0	0
9	135	0	1	0	1	0	135	0
10	187	-1	0	1	0	-187	0	0
11	176	0	-1	0	1	0	-176	0
12	250	1	0	1	0	250	0	0
78	**2020**	0	0	6	6	**220**	**-50**	0

$$\sum_{t=1}^{n} dt(t)=an+b\sum_{t=1}^{n}\cos 90\ t+c\sum_{t=1}^{n}\sin 90t$$

2020 = 12.a + b.0 + c.0

a = 168.33

220 = a.0 + b.6 + c.0

b = 37

-50 = a.0 + b.0 + c.6

c = -8.333

$$\sum_{t=1}^{n} dt(t)\,Cos\,90\ t=a\sum_{t=1}^{n}Cos\,90t+b\sum_{t=1}^{n}Cos^2\ 90\ t+c\sum_{t=1}^{n}Sin90\ t\,Cos\,90\ t$$

dt ' = 168.33 - 37 Cos 90t - 8.33 Sin 90t

Ringkasan MAE Siklis S150

$dt' = 168.33 - 37 \cos 90t - 8.33 \sin 90t$

Bln	dt (unit)	dt^I	$\lvert dt - dt^I \rvert$
1	115	160	45.0
2	147	205.33	58.3
3	147	176.66	29.7
4	204	131.33	72.7
5	167	160	7.0
6	124	205.33	81.3
7	144	176.66	32.7
8	224	131.33	92.7
9	135	160	25.0
10	187	205.33	18.3
11	176	176.66	0.7
12	250	131.33	118.7
			582

MAE = 48.50

Peramalan Linier Siklis S150

Bln	dt (unit)	t^2	Cos90t	Sin90t	$(Cos90t)^2$	$(Sin90t)^2$	dt.Cos90t	dt.Sin90t	Sin90t.Cos90t	t.Cos90t	t.Sin90t	dt . t
1	115	1	0	1	0	1	0	115	0	0	1	115
2	147	4	-1	0	1	0	-147	0	0	-2	0	294
3	147	9	0	-1	0	1	0	-147	0	0	-3	441
4	204	16	1	0	1	0	204	0	0	4	0	816
5	167	25	0	1	0	1	0	167	0	0	5	835
6	124	36	-1	0	1	0	-124	0	0	-6	0	744
7	144	49	0	-1	0	1	0	-144	0	0	-7	1008
8	224	64	1	0	1	0	224	0	0	8	0	1792
9	135	81	0	1	0	1	0	135	0	0	9	1215
10	187	100	-1	0	1	0	-187	0	0	-10	0	1870
11	176	121	0	-1	0	1	0	-176	0	0	-11	1936
12	250	144	1	0	1	0	250	0	0	12	0	3000
78	**2020**	**650**	**0**	**0**	**6**	**6**	**220**	**-50**	**0**	**6**	**-6**	**14066**

Perhitungan Peramalan Linier Siklis S150

$\sum d(t) = na + b\sum t + c\sum \cos(90t) + d\sum \sin(90t)$

2020 = a. 12 + b. 78 + c. 0 + d. 0

2020 = 12 a + 78 b .....(1)

$\sum dt.t = a\sum t + b\sum t^2 + c\sum t.\cos(90t) + d\sum t.\sin(90t)$

14066 = a. 78 + b. 650 + c. 6 + d. (-6)

14066 = 78a + 650b + 6c - 6d .....(2)

$\sum dt.\cos(90t) = a\sum \cos(90t) + b\sum t.\cos(90t) + c\sum \cos^2(90t) + d\sum \sin(90t).\cos(90t)$

220 = a. 0 + b. 6 + c. 6 + d. 0

220 = 6b + 6c.....(3)

$\sum d(t).\sin(90t) = a\sum \sin(90t) + b\sum t.\sin(90t) + c\sum \sin(90t).\cos(90t) + d\sum \sin^2(90t)$

(-50) = a. 0 + b. (-6) + c. 0 + d. 6

(-50) = -6b + 6d .....(4)

(1) dan (2)

2020 = 12 a + 78 b | x 6.5 | 13130 = 78a + 507b

14066 = 78a + 650b + 6c - 6d | x 1 | 14066 = 78a + 650b + 6c - 6d -

(-936) = -143b - 6c + 6d

936 = 143b + 6c - 6d ...(5)

(3) dan (4)

220 = 6b + 6c

(-50) = -6b + 6d +

170 = 6c + 6d .....(6)

(5) dan (6)

936 = 143b + 6c - 6d

170 = 6c + 6d +

1106 = 143b + 12c .....(7)

(3) dan (7)

220 = 6b + 6c | x 2 | 440 = 12b + 12c

1106 = 143b + 12c | x 1 | 1106 = 143b + 12c -

(-666) = -131b

b = 5.08

(1)

2020 = 12 a + 78 b

2020 = 12 a + 78(5.08)

12a = 2020 - 396.55

a = 137.371

(3)

220 = 6b + 6c

220 = 6(5.08) + 6c

6c = 220 - 30.48

c = 31.58

(4)

(-50) = -6b + 6d

(-50) = -6(5.08) + 6d

(-50) = -30.5+ 6d

d = -3.25

dt ' = 137.371 - 5.08t + 31.58 cos 90t - 3.25 sin 90t

Ringkasan MAE Linier Siklis S150

$dt' = 137.371 - 5.08t + 31.58 \cos 90t - 3.25 \sin 90t$

Bln	dt (unit)	dt^I	$\lvert dt - dt^I \rvert$
1	115	129.04	14
2	147	95.63	51.4
3	147	125.38	21.6
4	204	148.63	55.4
5	167	108.72	58.3
6	124	75.31	48.7
7	144	105.06	38.9
8	224	128.31	95.7
9	135	88.40	46.6
10	187	54.99	132
11	176	84.74	91.3
12	250	107.99	142
			795.87

MAE = 66.32

Peramalan DES (α=0.2) S150

Bln	dt (unit)	St^I	St^{II}	a	b	Ft+m	$\lvert dt - dt^I \rvert$
1	115	-	-	-	-	-	-
2	147	121.4	116.3	126.52	1.28	-	-
3	147	147	122.42	171.58	6.14	127.80	19.20
4	204	158.4	129.62	187.18	7.20	177.72	26.28
5	167	196.6	143.02	250.18	13.40	194.38	27.38
6	124	158.4	146.09	170.71	3.08	263.58	139.58
7	144	128	142.47	113.53	-3.62	173.78	29.78
8	224	160	145.98	174.02	3.51	109.91	114.09
9	135	206.2	158.02	254.38	12.04	177.53	42.53
10	187	145.4	155.50	135.30	-2.52	266.42	79.42
11	176	184.8	161.36	208.24	5.86	132.78	43.22
12	250	190.8	167.25	214.35	5.89	214.10	35.90
							557.38

$a = 2St^I - St^{II}$

$b = (a/(1-a)) * (St^I - St^{II})$

$b = (0.2/(1-0.2)) * (St^I - St^{II})$

$b = (0.8) * (St^I - St^{II})$

$Ft+m = at + bt * m$

MAE = 55.74

Peramalan DMA (n = 2) S150

Bln	dt (unit)	St^I	St^{II}	a	b	$Ft+m=dt^I$	$I dt - dt^I I$
1	115	-	-	-	-	-	-
2	147	131	-	-	-	-	-
3	147	147	139	155	16	-	-
4	204	175.5	161.25	189.75	28.5	171	33
5	167	185.5	180.5	190.5	10	218.25	51.25
6	124	145.5	165.5	125.5	-40	200.5	76.5
7	144	134	139.75	128.25	-11.5	85.5	58.5
8	224	184	159	209	50	116.75	107.25
9	135	179.5	181.75	177.25	-4.5	259	124
10	187	161	170.25	151.75	-18.5	172.75	-14.25
11	176	181.5	171.25	191.75	20.5	133.25	42.75
12	250	213	197.25	228.75	31.5	212.25	37.75
							516.75

$at = 2St^I - St^{II}$

$bt = 2(St^I - St^{II}) / (n-1)$

$Ft+m = at + bt.m$

$Ft+m = dt\ I$

MAE = 57.42

Uji Verifikasi S20 Peramalan Konstan

Bln	dt (unit)	dt^{I}	dt^{I} - dt	I MRt I
1	1107	1782.75	675.75	-
2	1491	1782.75	291.75	384
3	1774	1782.75	8.75	283
4	1540	1782.75	242.75	234
5	2080	1782.75	-297.25	540
6	1751	1782.75	31.75	329
7	1728	1782.75	54.75	23
8	2104	1782.75	-321.25	376
9	1753	1782.75	29.75	351
10	1934	1782.75	-151.25	181
11	2246	1782.75	-463.25	312
12	1885	1782.75	-102.25	361
				3374

I MRt I = 675075 - 291.75 = 384

$\overline{MR}$ = 3374 / (12 -1)

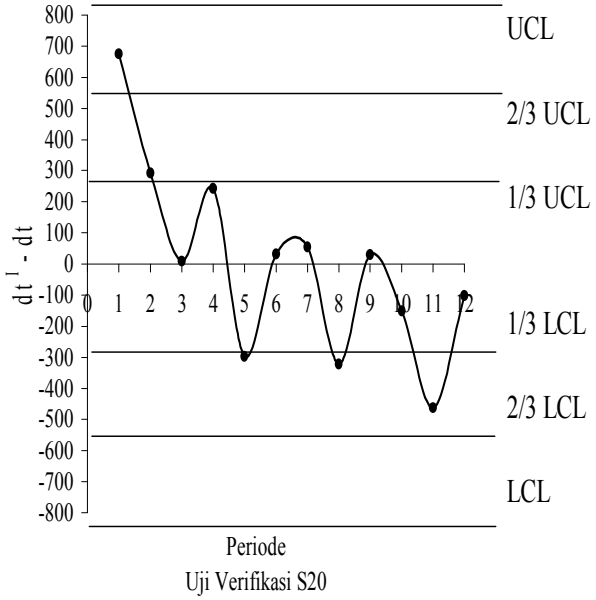
$\overline{MR}$ = 306.73

UCL = 2.66 * 306.73

UCL = 815.89 LCL = -815.89

2/3 UCL = 543.93 2/3 LCL = -543.93

1/3 UCL = 271.96 1/3 LCL = -271.96



Uji Verifikasi S20

Uji Verifikasi S50 Peramalan SMA (n = 2)

Bln	dt (unit)	dt^{I}	dt^{I} - dt	I MRt I
1	509	-	0	-
2	450	-	0	-
3	510	479.5	-30.5	-
4	425	480	55	85.5
5	614	467.5	-146.5	201.5
6	560	519.5	-40.5	106
7	559	587	28	68.5
8	697	559.5	-137.5	165.5
9	575	628	53	190.5
10	669	636	-33	86
11	715	622	-93	60
12	713	692	-21	72
				1035.5

I MRt I = -30.5 - 55 = -85.5 * -1 = 85.5

$\overline{MR}$ = 1035.5 / (12 -3)

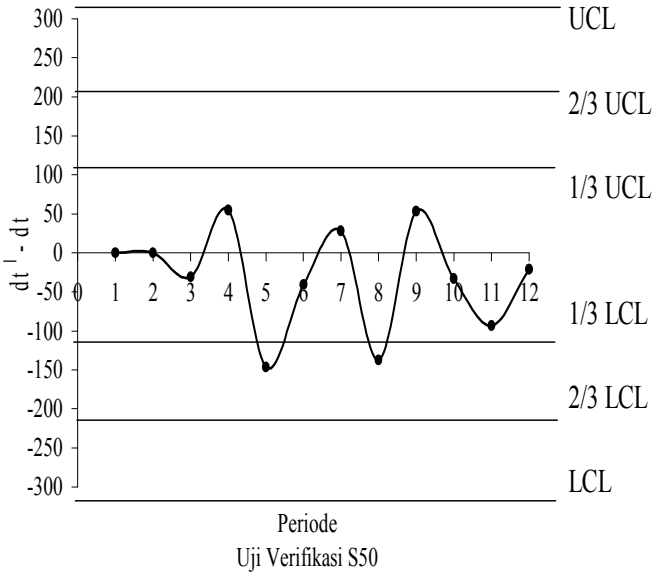
$\overline{MR}$ = 115.06

UCL = 2.66 * 115.06

UCL = 306.05 LCL = -306.05

2/3 UCL = 204.03 2/3 LCL = -204.03

1/3 UCL = 102.02 1/3 LCL = -102.02



Uji Verifikasi S50

Uji Verifikasi S100 Peramalan SMA (n = 2)

Bln	dt (unit)	$dt^{'}$	$dt^{'}$ - dt	| MRt |
1	208	-	0	-
2	196	-	0	-
3	251	202	-49	-
4	200	223.5	23.5	72.5
5	234	225.5	-8.5	32
6	197	217	20	28.5
7	191	215.5	24.5	4.5
8	280	194	-86	110.5
9	249	235.5	-13.5	72.5
10	321	264.5	-56.5	43
11	281	285	4	60.5
12	326	301	-25	29
				453

| MRt | = -49 - 23.5 = -72.5 * -1 = 72.5

$\overline{MR}$ = 453 / (12 -3)

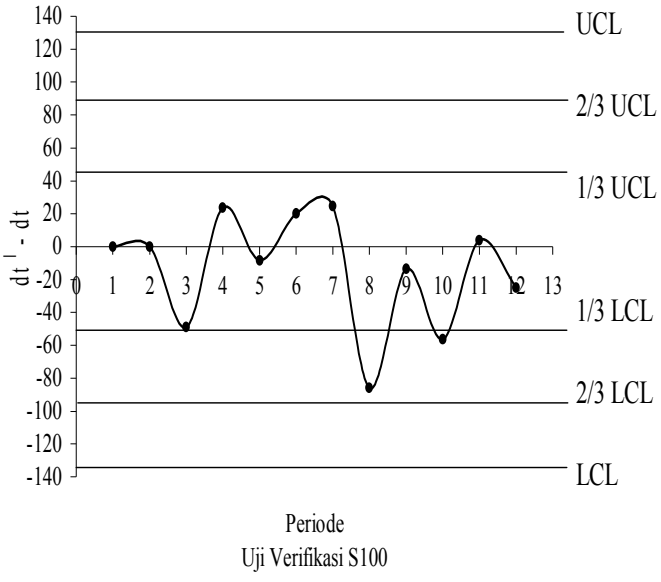
$\overline{MR}$ = 50.33

UCL = 2.66 * 50.33

UCL = 133.89 LCL = -133.89

2/3 UCL = 89.26 2/3 LCL = -89.26

1/3 UCL = 44.63 1/3 LCL = -44.63



Uji Verifikasi S100

Uji Verifikasi S150 Peramalan Siklis

Bln	dt (unit)	$dt^{'}$	$dt^{'}$ - dt	| MRt |
1	115	160	45	-
2	147	205.33	58.33	13.33
3	147	176.66	29.66	28.67
4	204	131.33	-72.67	102.33
5	167	160	-7	65.67
6	124	205.33	81.33	88.33
7	144	176.66	32.66	48.67
8	224	131.33	-92.67	125.33
9	135	160	25	117.67
10	187	205.33	18.33	-6.67
11	176	176.66	0.66	17.67
12	250	131.33	-118.67	119.33
				720.33

| MRt | = 52.1 - 20.93 = 31.17

$\overline{MR}$ = 812.5 / (12 -1)

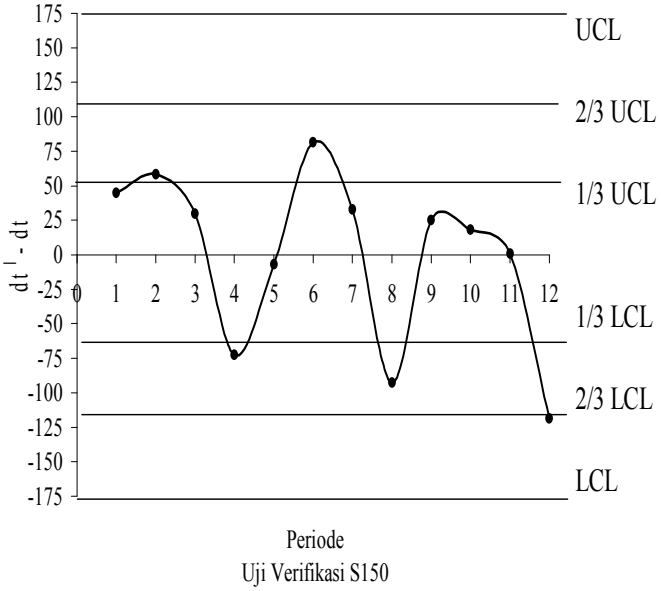
$\overline{MR}$ = 65.48

UCL = 2.66 * 73.86

UCL = 174.19 LCL = -174.19

2/3 UCL = 116.13 2/3 LCL = -116.13

1/3 UCL = 58.06 1/3 LCL = -58.06



Uji Verifikasi S150

Uji Verifikasi AS5 Peramalan Konstan

Bln	dt (unit)	$dt^{|}$	$dt^{|}$ - dt	| MRt |
1	129	177.58	48.58	-
2	146	177.58	31.58	17
3	196	177.58	-18.42	50
4	127	177.58	50.58	69
5	221	177.58	-43.42	94
6	165	177.58	12.58	56
7	208	177.58	-30.42	43
8	216	177.58	-38.42	8
9	174	177.58	3.58	42
10	200	177.58	-22.42	26
11	186	177.58	-8.42	14
12	163	177.58	14.58	23
				442

| MRt | = 48.58 - 31.58 = 17

$\overline{MR}$ = 442 / (12 -1)

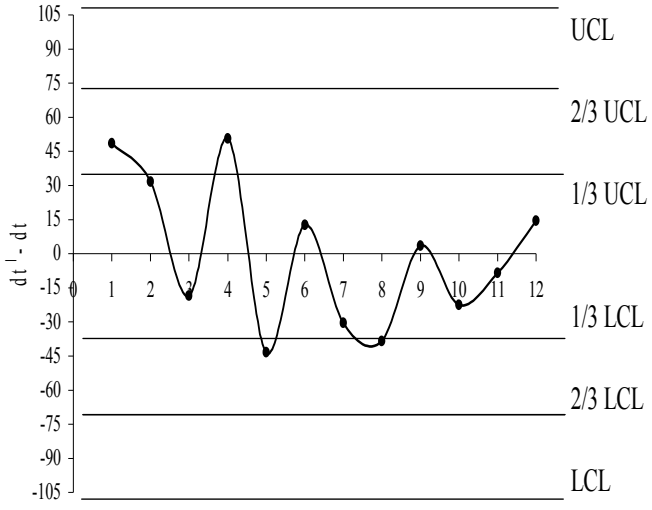
$\overline{MR}$ = 40.18

UCL = 2.66 * 40.18

UCL = 106.88 LCL = -106.88

2/3 UCL = 71.26 2/3 LCL = -71.26

1/3 UCL = 35.63 1/3 LCL = -35.63



Periode

Uji verifikasi AS5

Uji Verifikasi AS10 Peramalan SMA (n = 2)

Bln	dt (unit)	$dt^{|}$	$dt^{|}$ - dt	| MRt |
1	217	-	0	-
2	247	-	0	-
3	243	232	-11	-
4	226	245	19	30
5	319	234.5	-84.5	103.5
6	269	272.5	3.5	88
7	258	294	36	32.5
8	346	263.5	-82.5	118.5
9	286	302	16	98.5
10	338	316	-22	38
11	323	312	-11	11
12	331	330.5	-0.5	10.5
				530.5

| MRt | = -11 - 19 = -30 * -1 = 30

$\overline{MR}$ = 530.5 / (12 -3)

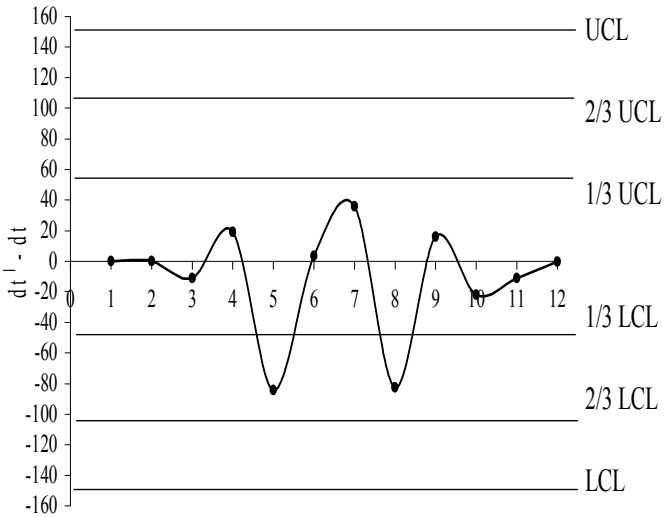
$\overline{MR}$ = 58.94

UCL = 2.66 * 58.94

UCL = 156.79 LCL = -156.79

2/3 UCL = 104.53 2/3 LCL = -104.53

1/3 UCL = 52.26 1/3 LCL = -52.26



Periode

Uji Verifikasi AS10

Uji Verifikasi AS25 Peramalan SMA (n = 2)

Bln	dt (unit)	$dt^{'}$	$dt^{'}$ - dt	| MRt |
1	178	-	0	-
2	182	-	0	-
3	226	180	-46	-
4	190	204	14	60
5	274	208	-66	80
6	217	232	15	81
7	249	245.5	-3.5	18.5
8	275	233	-42	38.5
9	242	262	20	62
10	312	258.5	-53.5	73.5
11	287	277	-10	43.5
12	315	299.5	-15.5	5.5
				462.5

| MRt | = -46 - 14 = -60 * -1 = 60

$\overline{MR}$ = 462.5 / (12 -3)

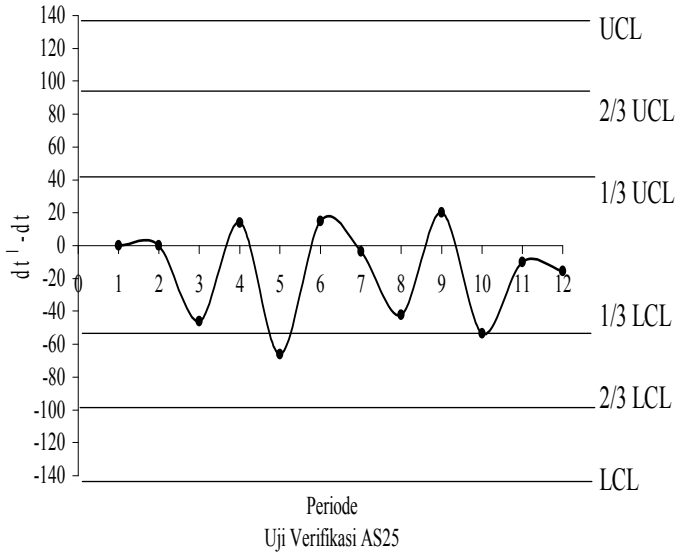
$\overline{MR}$ = 51.39

UCL = 2.66 * 51.39

UCL = 136.69 LCL = -136.69

2/3 UCL = 91.13 2/3 LCL = -91.13

1/3 UCL = 45.56 1/3 LCL = -45.56



Uji Verifikasi AS25

Uji Verifikasi AS50 Peramalan Konstan

Bln	dt (unit)	$dt^{'}$	$dt^{'}$ - dt	| MRt |
1	102	157.58	55.58	-
2	140	157.58	17.58	38
3	190	157.58	-32.42	50
4	138	157.58	19.58	52
5	163	157.58	-5.42	25
6	119	157.58	38.58	44
7	139	157.58	18.58	20
8	189	157.58	-31.42	50
9	177	157.58	-19.42	12
10	189	157.58	-31.42	12
11	155	157.58	2.58	34
12	190	157.58	-32.42	35
				372

| MRt | = 56.33 - 18.33 = 38

$\overline{MR}$ = 372 / (12 -1)

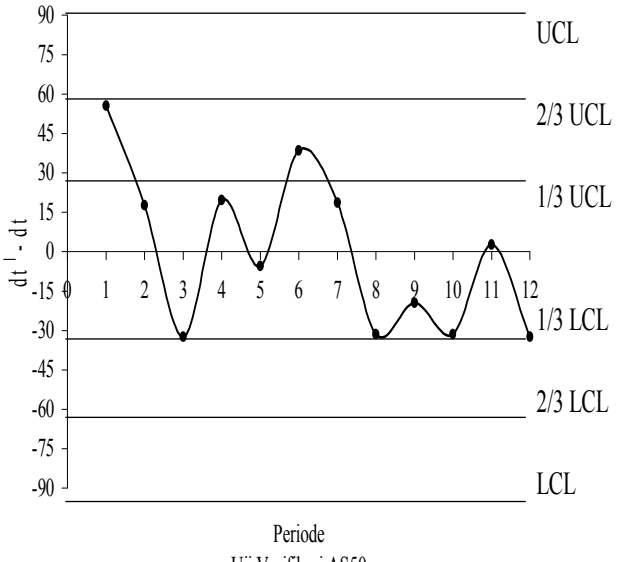
$\overline{MR}$ = 33.82

UCL = 2.66 * 33.82

UCL = 89.96 LCL = -89.96

2/3 UCL = 59.97 2/3 LCL = -59.97

1/3 UCL = 29.99 1/3 LCL = -29.99



Uji Verifikasi AS50

Perhitungan Uji Normal

1. **Type S20**

Input :

	bln	demand
1	1.00	1107.00
2	2.00	1491.00
3	3.00	1774.00
4	4.00	1540.00
5	5.00	2080.00
6	6.00	1751.00
7	7.00	1728.00
8	8.00	2104.00
9	9.00	1753.00
10	10.00	1934.00
11	11.00	2246.00
12	12.00	1885.00

Ouput :

NPar Tests

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
BLN	12	6.5000	3.60555	1.00	12.00
DEMAND	12	1782.7500	308.24168	1107.00	2246.00

One-Sample Kolmogorov-Smirnov Test

		BLN	DEMAND
N		12	12
Normal Parameters[a,b]	Mean	6.5000	1782.7500
	Std. Deviation	3.60555	308.24167
Most Extreme Differences	Absolute	.089	.180
	Positive	.089	.095
	Negative	-.089	-.180
Kolmogorov-Smirnov Z		.309	.622
Asymp. Sig. (2-tailed)		1.000	.834

a. Test distribution is Normal.

b. Calculated from data.

2. Type S50

Input :

	bln	demand
1	1.00	509.00
2	2.00	450.00
3	3.00	510.00
4	4.00	425.00
5	5.00	614.00
6	6.00	560.00
7	7.00	559.00
8	8.00	697.00
9	9.00	575.00
10	10.00	669.00
11	11.00	715.00
12	12.00	713.00

Ouput :

NPar Tests

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
BLN	12	6.5000	3.60555	1.00	12.00
DEMAND	12	583.0000	100.13809	425.00	715.00

One-Sample Kolmogorov-Smirnov Test

		BLN	DEMAND
N		12	12
Normal Parameters [a,b]	Mean	6.5000	583.0000
	Std. Deviation	3.60555	100.13808
Most Extreme Differences	Absolute	.089	.138
	Positive	.089	.115
	Negative	-.089	-.138
Kolmogorov-Smirnov Z		.309	.478
Asymp. Sig. (2-tailed)		1.000	.976

a. Test distribution is Normal.

b. Calculated from data.

3. Type S100

Input :

	bln	demand
1	1.00	208.00
2	2.00	196.00
3	3.00	251.00
4	4.00	200.00
5	5.00	234.00
6	6.00	197.00
7	7.00	191.00
8	8.00	280.00
9	9.00	249.00
10	10.00	321.00
11	11.00	281.00
12	12.00	326.00

Output :

NPar Tests

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
BLN	12	6.5000	3.60555	1.00	12.00
DEMAND	12	244.5000	48.65743	191.00	326.00

One-Sample Kolmogorov-Smirnov Test

		BLN	DEMAND
N		12	12
Normal Parameters[a,b]	Mean	6.5000	244.5000
	Std. Deviation	3.60555	48.65743
Most Extreme Differences	Absolute	.089	.190
	Positive	.089	.190
	Negative	-.089	-.136
Kolmogorov-Smirnov Z		.309	.658
Asymp. Sig. (2-tailed)		1.000	.779

a. Test distribution is Normal.

b. Calculated from data.

4. Type S150

Input :

	bln	demand
1	1.00	115.00
2	2.00	147.00
3	3.00	147.00
4	4.00	204.00
5	5.00	167.00
6	6.00	124.00
7	7.00	144.00
8	8.00	224.00
9	9.00	135.00
10	10.00	187.00
11	11.00	176.00
12	12.00	250.00

NPar Tests

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
BLN	12	6.5000	3.60555	1.00	12.00
DEMAND	12	168.3333	41.42097	115.00	250.00

One-Sample Kolmogorov-Smirnov Test

		BLN	DEMAND
N		12	12
Normal Parameters[a,b]	Mean	6.5000	168.3333
	Std. Deviation	3.60555	41.42097
Most Extreme Differences	Absolute	.089	.197
	Positive	.089	.197
	Negative	-.089	-.099
Kolmogorov-Smirnov Z		.309	.682
Asymp. Sig. (2-tailed)		1.000	.742

a. Test distribution is Normal.

b. Calculated from data.

5. Type As5

Input :

	bln	demand
1	1.00	129.00
2	2.00	146.00
3	3.00	196.00
4	4.00	127.00
5	5.00	221.00
6	6.00	165.00
7	7.00	208.00
8	8.00	216.00
9	9.00	174.00
10	10.00	200.00
11	11.00	186.00
12	12.00	163.00

Output :

NPar Tests

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
BLN	12	6.5000	3.60555	1.00	12.00
DEMAND	12	177.5833	32.33197	127.00	221.00

One-Sample Kolmogorov-Smirnov Test

		BLN	DEMAND
N		12	12
Normal Parameters [a,b]	Mean	6.5000	177.5833
	Std. Deviation	3.60555	32.33197
Most Extreme Differences	Absolute	.089	.132
	Positive	.089	.100
	Negative	-.089	-.132
Kolmogorov-Smirnov Z		.309	.458
Asymp. Sig. (2-tailed)		1.000	.985

a. Test distribution is Normal.

b. Calculated from data.

6. **Type As10**

Input :

	bln	demand
1	1.00	217.00
2	2.00	247.00
3	3.00	243.00
4	4.00	226.00
5	5.00	319.00
6	6.00	269.00
7	7.00	258.00
8	8.00	346.00
9	9.00	286.00
10	10.00	338.00
11	11.00	323.00
12	12.00	331.00

Output :

NPar Tests

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
BLN	12	6.5000	3.60555	1.00	12.00
DEMAND	12	283.5833	46.24138	217.00	346.00

One-Sample Kolmogorov-Smirnov Test

		BLN	DEMAND
N		12	12
Normal Parameters [a,b]	Mean	6.5000	283.5833
	Std. Deviation	3.60555	46.24138
Most Extreme Differences	Absolute	.089	.195
	Positive	.089	.127
	Negative	-.089	-.195
Kolmogorov-Smirnov Z		.309	.675
Asymp. Sig. (2-tailed)		1.000	.753

a. Test distribution is Normal.

b. Calculated from data.

7. Type As25

Input :

	bln	demand
1	1.00	178.00
2	2.00	182.00
3	3.00	226.00
4	4.00	190.00
5	5.00	274.00
6	6.00	217.00
7	7.00	249.00
8	8.00	275.00
9	9.00	242.00
10	10.00	312.00
11	11.00	287.00
12	12.00	315.00

Output :

NPar Tests

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
BLN	12	6.5000	3.60555	1.00	12.00
DEMAND	12	245.5833	48.18800	178.00	315.00

One-Sample Kolmogorov-Smirnov Test

		BLN	DEMAND
N		12	12
Normal Parameters [a,b]	Mean	6.5000	245.5833
	Std. Deviation	3.60555	48.18800
Most Extreme Differences	Absolute	.089	.139
	Positive	.089	.126
	Negative	-.089	-.139
Kolmogorov-Smirnov Z		.309	.481
Asymp. Sig. (2-tailed)		1.000	.975

a. Test distribution is Normal.

b. Calculated from data.

8. Type As50

Input :

	bln	demand
1	1.00	102.00
2	2.00	140.00
3	3.00	190.00
4	4.00	138.00
5	5.00	163.00
6	6.00	119.00
7	7.00	139.00
8	8.00	189.00
9	9.00	177.00
10	10.00	189.00
11	11.00	155.00
12	12.00	190.00

Output :

NPar Tests

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
BLN	12	6.5000	3.60555	1.00	12.00
DEMAND	12	157.5833	30.30889	102.00	190.00

One-Sample Kolmogorov-Smirnov Test

		BLN	DEMAND
N		12	12
Normal Parameters [a,b]	Mean	6.5000	157.5833
	Std. Deviation	3.60555	30.30889
Most Extreme Differences	Absolute	.089	.183
	Positive	.089	.142
	Negative	-.089	-.183
Kolmogorov-Smirnov Z		.309	.635
Asymp. Sig. (2-tailed)		1.000	.815

a. Test distribution is Normal.

b. Calculated from data.

Perhitungan Ongkos Total Persediaan Metode Q

Diketahui :

Type = S20

Kasus = Lost sales

L = 2 hari = 2 / 25 = 0.08 bulan

μ= D= 1782.75 = 1783 unit

μ L = 1783*0.08 = 142.6 =143 unit (rata-rata permintaan)

σ = 1.25 * MAE = 1.25 * 222.54 = 278.18 unit / bulan

σ L = $278.18*\sqrt{0.08}$ = 78.68 unit (permintaan selama lead time)

O = Rp.19.800 /kali (ongkos pesan)

IC= h= Rp.248 /unit/bulan (ongkos simpan)

π = Rp.1000 / unit (ongkos kekurangan persediaan)

1. $Q_1 = \sqrt{\frac{2OD}{IC}} = \sqrt{\frac{2*19800*1783}{248}}$

Q_1 = 533.6

Q_1 = 533.6 unit (pemesanan optimum 1)

2. $\alpha_1 = \frac{Q_1 * IC}{(Q_1 * IC) + (\pi * D)}$

$\alpha_1 = \frac{533.6 * 248}{(533.6*248)+(1000*1783)}$

α_1 = 0.0691 (kemungkinan kekurangan barang)

Interpolasi :

$$\frac{k - 1.48}{1.49 - 1.48} = \frac{0.0691 - 0.06944}{0.06811 - 0.06944} \rightarrow k = 1.482$$

$Z\alpha_1$=k = 1.482

$F_1(k)$ = 0.1334 (dari tabel distribusi normal)

$Gu_1(k)$ = 0.03067 (dari tabel distribusi normal)

3. $r_1 =$ $\mu L + (Z\alpha * \sigma L)$

$r_1 =$ $143 + (1.482 * 78.68)$

$r_1 =$ 259.60

$r_1 =$ 260 unit (reorder point 1)

4. $Nr =$ $\sigma L * Gu(k)$

$Nr =$ $78.68 * 0.03067$

$Nr =$ 2.413

$Nr =$ 2.413 unit (jumlah kekurangan persediaan)

5. $Q_2 =$ $\sqrt{\frac{2D(O+\pi*Nr)}{IC}} = \sqrt{\frac{2*1783\ (19800 + (1000 * 2.413))}{248}}$

$Q_2 =$ 565.16

$Q_2 =$ 566 unit (pemesanan optimum 2)

6. $\alpha_2 =$ $\frac{Q_2 * IC}{(Q_2 * IC) + (\pi * D)}$

$\alpha_2 =$ $\frac{565.16 * 248}{(565.16*248)+(1000*1783)}$

$\alpha_2 =$ 0.0729

Interpolasi :

$$\frac{k - 1.46}{1.47 - 1.46} = \frac{0.0729 - 0.07215}{0.07078 - 0.07215} \rightarrow k = 1.461$$

$Z\alpha_2 = k = 1.461$

7. $r_2 =$ $\mu L + (Z\alpha * \sigma L)$

$r_2 =$ $143 + (1.461 * 78.68)$

$r_2 =$ 257.95

$r_2 =$ 258 unit (reorder point 2)

8. $\frac{r_1 - r_2}{r_1} x100\% \leq 1\%$ maka sudah optimal

$$\frac{260 - 258}{260} * 100\% = 0.769\% \rightarrow \text{sudah optimal}$$

9. $OT =$ O.Pesan + O.Simpan + O.Stock Out

$OT =$ $\left(\frac{D}{Q_2}\right) * O + IC\left(\frac{Q_2}{2} + r_2 - \mu L + Nr\right) + \left(\frac{D}{Q_2}\right) * Nr * \pi$

$OT =$ $\left[\frac{1783}{566}\right] * 19800 + 248 * \left[\frac{566}{2} + 258 - 143 + 2.413\right] + \left[\frac{1783}{566}\right] * 2.413 * 1000$

$OT =$ $62466+99186+7613$

$OT =$ Rp.169.266 / bln

Jadi ongkos total per bulan type S20 menggunakan metode Q = Rp. 169.266 / bulan.

Perhitungan Ongkos Total Persediaan Metode P Multi Item

Diketahui :

Type = S20

Kasus = Lost sales

L = 2 hari = 2 / 25 = 0.08 bulan

μ= D = 1782.75 = 1783 unit

μ L = 1783*0.08 = 142.6 =143 unit (rata-rata permintaan)

σ = 1.25 * MAE = 1.25 * 222.54 = 278.18 unit / bulan

σ L = $278.18*\sqrt{0.08}$ = 78.68 unit (permintaan selama lead time)

O = Rp. 59800 /kali (ongkos pesan)

IC= h = Rp.248 /unit/bulan (ongkos simpan)

π = Rp. 1.000 / unit (ongkos kekurangan persediaan)

C = Rp.12.000 / bulan (ATM BCA) = o.pesan yang hanya 1 kali untuk semua

nc = 8*(5600+3000)=Rp.68.800/ bulan(Telepon & E-mail) =o.pesan per bagian

n = 8 type (jumlah type data)

F = 1.24 % (persentase ongkos simpan perbulan)

Nilai Permintaan Bulanan

Type	dt (unit / bulan)	Modal (Rp)	Nilai permintaan bulanan (Rp)
S20	1783	20,000	35,655,000
S50	567	49,000	27,787,900
S100	236	94,000	22,216,900
S150	168	138,500	23,318,553
As5	178	5,500	976,708
As10	280	12,000	3,362,400
As25	240	27,000	6,478,650
As50	158	53,000	8,351,917
		Total =	128,148,028

1. To = $\sqrt{\frac{2\,(C + n\,c)}{F\sum_{i=1}^{n}(P_i R_i)}} = \sqrt{\frac{2(12000+68800)}{1.24\%*128.148.028}}$

To = 0.319

To = 0.319 bulan = 7.9 hari (interval pemesanan)

2. $\alpha = \dfrac{IC^{*}To}{(IC^{*}To)+\pi} = \dfrac{248^{*}0.319}{(248^{*}0.319)+1000}$

$\alpha =$ 0.0733 (kemungkinan kekurangan barang)

Interpolasi :

$$\frac{k-1.45}{1.46-1.45} = \frac{0.0733-0.07353}{0.07215-0.07353} \rightarrow k = 1.452$$

3. $Z\alpha = k = 1.452$

F(k) = 0.1394 (dari tabel distribusi normal)

Gu(k) = 0.03281 (dari tabel distribusi normal)

4. $R = D^{*}To+\mu L+k^{*}\sigma\sqrt{To+L} =$

$R = 1783^{*}0.319 +143 + 1.452^{*}278.18^{*}\sqrt{0.319+0.08}$

R = 966.92

R = 967 unit (persediaan maximum)

5. $Nr = \sigma\sqrt{To+L}\,^{*}Gu(k) = 278.18\sqrt{0.319+0.08}\,^{*}0.03281$

Nr = 5.77

Nr = 5.77 unit (jumlah kekurangan persediaan)

6. OT = O.Pesan + O.Simpan + O.Stock Out

$$OT = \frac{O}{To} + IC\left[R - \mu L - \frac{D^{*}To}{2}\right] + \left(IC + \frac{\pi}{To}\right) Nr$$

$$OT = \frac{59800}{0.319} + 248\left[967-143-\frac{1783^{*}0.319}{2}\right] + \left[248+\frac{1000}{0.319}\right]^{*}5.77$$

OT = 187461+133913+19502

OT = Rp.340.876 / bulan

Jadi ongkos total / bulan type S20 menggunakan metode P Multi Item = Rp. 340.876 / bulan

Perhitungan Ongkos Total Persediaan Metode Perusahaan

Diketahui :

Type = S20
Kasus = Lost sales
L = 2 hari = 2 / 25 = 0.08 bulan
μ= D = 1782.75 = 1783 unit
μ L = 1783*0.08 = 142.6 =143 unit (rata-rata permintaan)
σ = 1.25 * MAE = 1.25 * 222.54 = 278.18 unit / bulan
O = Rp.59.800 / kali (ongkos pesan)
IC= h = Rp.248 / unit / bulan (ongkos simpan)
π = Rp.1000 / unit (ongkos kekurangan persediaan)

1. To = 2 hari = 0.08 bulan (interval pemesanan)

2. α = $\sqrt{\frac{IC*To}{IC*To+\pi}} = \sqrt{\frac{248*0.08}{(248*0.08)+1000}}$

α = 0.1395

Interpolasi :

$\frac{k-1.08}{1.09-1.08} = \frac{0.1395-0.1401}{0.1379-0.1401} \rightarrow k = 1.082$

$Z\alpha = k$ = 1.082

F(k) = 0.2227 (dari tabel distribusi normal)

3. R = $D*To+\mu L+k*\sigma\sqrt{To+L} =$

R = $1783 * 0.08 + 143 + 1.082 * 278.18 \sqrt{0.08 + 0.08}$

R = 406.02

R = 407 unit (persediaan maximum)

4. Nr = $(D.To + \mu L - R)\alpha + \sigma\sqrt{To + L} * F(k)$

Nr = $(1783*0.08+143-407)0.1395+278.18\sqrt{0.08+0.08}*0.2227$

Nr = 7.85

Nr = 7.85 unit (jumlah kekurangan persediaan)

5. OT = O.Pesan + O.Simpan + O.Stock Out

OT = $\frac{O}{To} + IC\left[R - \mu L - \frac{D*To}{2} + Nr\right] + (IC + \frac{\pi}{To}) Nr$

OT = $\frac{59800}{0.08} + 248\left[407 - 143 - \frac{1783*0.08}{2} + 7.85\right] + \left[248 + \frac{1000}{0.08}\right] * 7.85$

OT = 747500+49526+101826

OT = Rp.898.852 / bulan

Jadi ongkos total per bulan type S20 menggunakan metode Perusahaan = Rp.898.852 / bulan.