LAMPIRAN

Lampiran 1. *Downtime* Penggantian Komponen Profibus dan Kontaktor September 2021 – Maret 2023

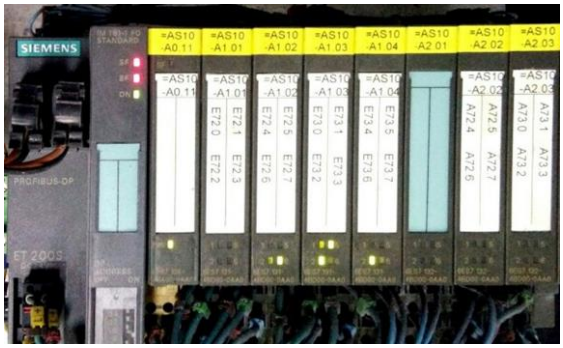
No	Tanggal	Nama Komponen	Jenis Kerusakan	*Downtime* (menit)	Biaya penggantian
1	07.09.2021	Profibus	Module error	30	Rp 1.250.000
2	26.09.2021	Kontaktor	Tidak berfungsi	20	Rp 650.000
3	28.09.2021	Accumulator Scrap cutter	Sering macet	*35*	Rp. 650.000
4	04.10.2021	Profibus	Tidak berfungsi	45	Rp 1.250.000
5	11.10.2021	Preassure transmitter	Tidak berfungsi	30	Rp 770.000
6	19.10.2021	High preassure errror	Selang power pack bocor	100	Rp 170.000
7	25.10.2021	Kontaktor	Tidak berfungsi	25	Rp 650.000
8	25.10.2021	Filter elektrik hidrolik	Kotor	30	Rp 450.000
9	09.11.2021	Profibus	Module error	30	Rp 1.250.000
10	26.11.2021	Kontaktor	Tidak berfungsi	20	Rp 650.000
11	04.12.2021	Profibus	Module error	70	Rp 1.250.000
12	08.12.2021	Hardisk code hijau 500 GB	Mesin tidak bisa press	20	Rp 500.000
13	10.12.2021	Needle bearing	Life time	40	Rp 220.000
14	26.12.2023	Kontaktor	Tidak berfungsi	25	Rp 650.000
15	03.01.2022	Sensor outfeed overload	Kabel putus (tidak berfungsi)	20	Rp. 7.500.000
16	08.01.2022	Profibus	Module error	40	Rp 1.250.000
17	28.01.2022	Kabel profibus	Kabel rusak tidak berfungsi	25	Rp. 150.000
18	25.01.2022	Kontaktor	Tidak berfungsi	25	Rp 650.000
19	06.02.2022	Profibus	Error	50	Rp 1.250.000
20	15.02.2022	Valve hidrolic	valve bocor	10	RP. 10.000
21	28.02.2022	Kontaktor	Tidak berfungsi	25	Rp 650.000
22	03.03.2022	Profibus	Error	50	Rp 1.250.000
23	24.03.2022	Coder tube	Error	15	Rp 155.000
24	25.03.2022	Kepala coder	Sensor mati	30	Rp 1.060.000
25	29.03.2022	Kontaktor	Tidak berfungsi	25	Rp 650.000
26	02.03.2022	Sim scrap cutter upper	Sim menipis	180	Rp 20.000
No	**Tanggal**	**Nama Komponen**	**Jenis Kerusakan**	***Downtime* (menit)**	**Biaya penggantian**
27	01.04.2022	Filter elektrik hidrolik	Kotor	30	Rp 450.000
28	02.04.2022	High preassure turun	Selang power pack bocor	360	Rp. 850.000
29	04.04.2022	Profibus	Error tidak berfungsi	35	Rp. 1.250.000
30	26.04.2022	Kontaktor	Terbakar	20	Rp. 650.000

31	26.04.2022	Selang hidrolik pintu mesin	Selang bocor	10	RP. 5000
32	26.04.2022	Filter oli Power pack	Filter kotor	50	Rp 600.000
33	03.05.2022	Sensor outfeed overload	Kabel putus (tidak berfungsi)	20	Rp. 7.500.000
34	04.05.2022	Profibus	Module error	70	Rp 1.250.000
35	28.05.2022	Kabel profibus	Kabel rusak tidak berfungsi	25	Rp. 150.000
36	30.05.2022	Kontaktor	Tidak berfungsi	25	Rp 650.000
37	10.06.2022	Profibus	Module error	70	Rp 1.250.000
38	25.06.2022	Kontaktor	Tidak berfungsi	25	Rp 650.000
39	01.07.2022	Profibus	Error	30	Rp 1.250.000
40	01.07.2022	Filter elektrik hidrolik	Kotor	30	Rp 450.000
41	25.07.2022	Kontaktor	Tidak berfungsi	25	Rp 650.000
42	26.07.2022	Anble button panel	Tidak berfungsi	15	Rp. 10.000
43	26.07.2022	Filter oli Power pack	Filter kotor	50	Rp 600.000
44	07.08.2022	Profibus	Error	30	Rp 1.250.000
45	24.08.2022	Coder tube	Error	15	Rp 155.000
46	25.08.2022	Kepala coder infeed	Sensor mati	30	Rp 1.060.000
47	26.08.2022	Kontaktor	Tidak berfungsi	25	Rp 650.000
48	02.08.2022	Sim scrap cutter upper	Sim menipis	180	Rp 20.000
49	07.09.2022	Scrap cutter lower	Pisau aus	180	Rp 8.000.000
50	10.09.2022	profibus	Module error	70	Rp 1.250.000
51	12.09.2022	Filter oli power pack	Kotor	50	Rp 600.000
52	12.09.2022	Scrap cutter	Accumulator	40	Rp 1.540.000
No	**Tanggal**	**Nama Komponen**	**Jenis Kerusakan**	***Downtime* (menit)**	**Biaya penggantian**
53	20.09.2022	Preassure transmiter	Tidak berfungsi	30	Rp 770.000
54	28.09.2022	Kontaktor	Terbakar	25	Rp 650.000
55	01.10.2022	Encoder	Tidak berfungsi	20	Rp 1.560.000
56	08.10.2022	Profibus	Module error	30	Rp 1.250.000
57	09.10.2022	Filter elektrik hidrolik	Kotor	30	Rp 450.000
58	15.10.2022	Gear box dan bearing	Gear dan bearing aus	360	Rp 5.350.000
59	12.10.2022	Filter oli Power pack	Filter kotor	50	Rp 600.000
60	27.10.2022	Kontaktor	Tidak berfungsi	25	Rp 650.000
61	11.11.2022	Profibus	Module error	70	Rp 1.250.000
62	02.11.2022	Pusher die channgger error	Penggantian valve	10	Rp 5.000
63	03.11.2022	Seal mog valve	Seal bocor	20	Rp 40.000
64	10.11.2022	Profibus	Module error	70	Rp 1.250.000
65	25.11.2022	Kontaktor	Tidak berfungsi	25	Rp 650.000

66	07.12.2022	Profibus	Error	30	Rp 1.250.000
67	24.12.2022	Coder tube	Error	15	Rp 155.000
68	25.12.2022	Kepala coder infeed	Sensor mati	30	Rp 1.060.000
69	26.12.2022	Kontaktor	Tidak berfungsi	25	Rp 650.000
70	08.01.2023	Profibus	Module error	70	Rp 1.250.000
71	08.01.2023	Hardisk code hijau 500 GB	Mesin tidak bisa press	20	Rp 500.000
72	10.01.2023	Needle bearing	Life time	40	Rp 220.000
73	23.01.2023	Kontaktor	Tidak berfungsi	25	Rp 650.000
74	01.02.2023	Valve 10-Y10	Valve bocor	10	Rp 150.000
75	04.02.2023	Profibus	Tidak berfungsi	40	Rp 1.250.000
76	11.02.2023	Preassure transmitter	Tidak berfungsi	30	Rp 770.000
77	19.02.2023	High preassure errror	Selang power pack bocor	100	Rp 170.000
78	24.02.2023	Kontaktor	Tidak berfungsi	25	Rp 650.000
79	25.02.2023	Filter elektrik hidrolik	Kotor	30	Rp 450.000
80	01.03.2023	Encoder	Tidak berfungsi	20	Rp 1.560.000
No	**Tanggal**	**Nama Komponen**	**Jenis Kerusakan**	***Downtime* (menit)**	**Biaya penggantian**
81	08.03.2023	Profibus	Module error	30	Rp 1.250.000
82	09.03.2023	Filter elektrik hidrolik	Kotor	30	Rp 450.000
83	15.03.2023	Gear box dan bearing	Gear dan bearing aus	360	Rp 5.350.000
84	12.03.2023	Filter oli Power pack	Filter kotor	50	Rp 600.000
85	29.03.2023	Kontaktor	Tidak berfungsi	25	Rp 650.000
86	01.04.2023	Filter elektrik hidrolik	Kotor	30	Rp 450.000
87	02.04.2023	High preassure turun	Selang power pack bocor	360	Rp 850.000
88	09.04.2023	Profibus	Error tidak berfungsi	35	Rp 1.250.000
89	26.04.2023	Kontaktor	Terbakar	20	Rp 650.000
90	26.04.2023	Selang hidrolik pintu mesin	Selang bocor	10	RP 5000
91	26.04.2023	Filter oli Power pack	Filter kotor	50	Rp 600.000

Contoh produk dari PT. Toshin Prima Fine Blanking

Mesin Fine Blanking 1100 Ton



Profibus error

Kontaktor yang terbakar

No	Jenis Kegitan	PRD/MNT	Periodik	Juli				Agustus				September				Oktober				November				Desember			
				I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
1	Pengecekan solenoid	MNT	6bulan																					■			
2	Penggantian kontaktor	MNT	6bulan																					■			
3	Pengecekan sambungan kabel	MNT	6bulan																						■		
4	Penggantian roda crane	MNT	1tahun																	■							
5	Pembersihan area rel	MNT	6bulan																					■			
6	penambahan grease pada gearbox	MNT	3bulan																					■			
															■												■
	Operator																										
	Supervisor MNT																										

Contoh jadwal perawatan dan penggantian komponen di mesin kompresor 2

Tabel 4.1
Daftar Waktu Penggantian Komponen Profibus

No	Tanggal Penggantian	Nama Komponen	Waktu (menit)	Biaya Penggantian
1	07.09.2021	Profibus	45	Rp 1.250.000
2	07.10.2021	Profibus	45	Rp 1.250.000
3	09.11.2021	Profibus	30	Rp 1.250.000
4	04.12.2021	Profibus	35	Rp 1.250.000
5	08.01.2022	Profibus	40	Rp 1.250.000
6	06.02.2022	Profibus	30	Rp 1.250.000

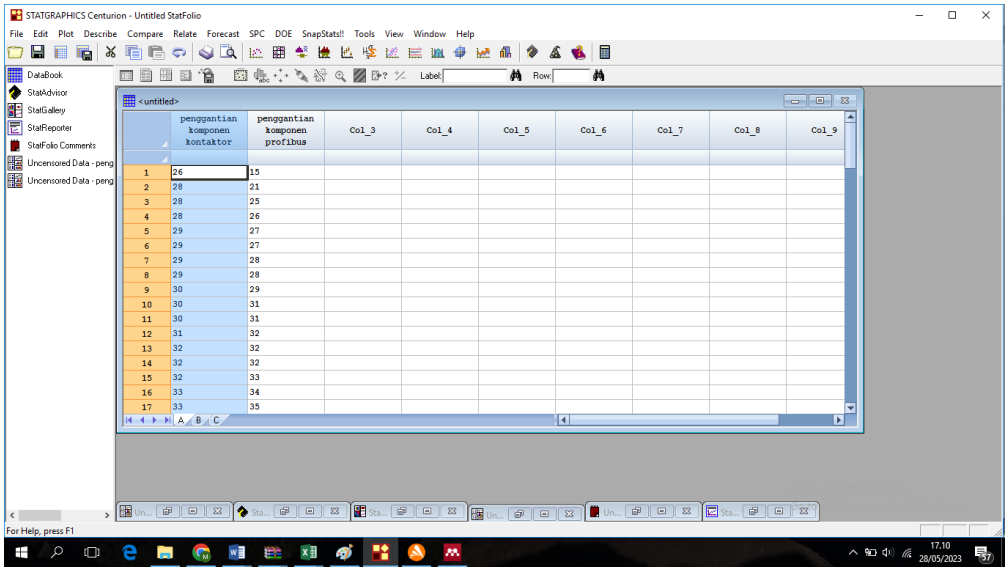
7	03.03.2022	Profibus	50	Rp 1.250.000
8	04.04.2022	Profibus	30	Rp 1.250.000
9	10.05.2022	Profibus	45	Rp 1.250.000
10	10.06.2022	Profibus	45	Rp 1.250.000
11	01.07.2022	Profibus	30	Rp 1.250.000
12	07.08.2022	Profibus	35	Rp 1.250.000
13	10.09.2022	Profibus	40	Rp 1.250.000
14	08.10.2022	Profibus	30	Rp 1.250.000
15	10.11.2022	Profibus	50	Rp 1.250.000
16	07.12.2022	Profibus	30	Rp 1.250.000
17	08.01.2023	Profibus	55	Rp 1.250.000
18	04.02.2023	Profibus	40	Rp 1.250.000
19	08.03.2023	Profibus	30	Rp 1.250.000
20	09.04.2023	Profibus	35	Rp 1.250.000
		Jumlah	770	Rp 25.000.000
		Rata-rata	38,5	Rp 1.250.000

Tabel 4.2

Daftar Waktu Penggantian Komponen Kontaktor

No	Tanggal Penggantian	Nama Komponen	Waktu (menit)	Biaya Penggantian
1	26.09.2021	Kontaktor	25	Rp 650.000
2	25.10.2021	Kontaktor	25	Rp 650.000
3	26.11.2021	Kontaktor	20	Rp 650.000
4	26.12.2021	Kontaktor	25	Rp 650.000
5	25.01.2022	Kontaktor	25	Rp 650.000
6	28.02.2022	Kontaktor	25	Rp 650.000
7	29.03.2022	Kontaktor	30	Rp 650.000
8	26.04.2022	Kontaktor	25	Rp 650.000
9	30.05.2022	Kontaktor	25	Rp 650.000
10	25.06.2022	Kontaktor	25	Rp 650.000
11	25.07.2022	Kontaktor	20	Rp 650.000
12	26.08.2022	Kontaktor	25	Rp 650.000
13	28.09.2022	Kontaktor	25	Rp 650.000
14	27.10.2022	Kontaktor	25	Rp 650.000
15	25.11.2022	Kontaktor	30	Rp 650.000
16	26.12.2022	Kontaktor	25	Rp 650.000
17	23.01.2023	Kontaktor	25	Rp 650.000
18	24.02.2023	Kontaktor	25	Rp 650.000
19	29.03.2023	Kontaktor	25	Rp 650.000
20	26.04.2023	Kontaktor	20	Rp 650.000
		Jumlah	495	Rp 13.000.000
		Rata-rata	24,75	Rp 650.000

Hasil Output Stargraphies 18 Profibus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DataBook
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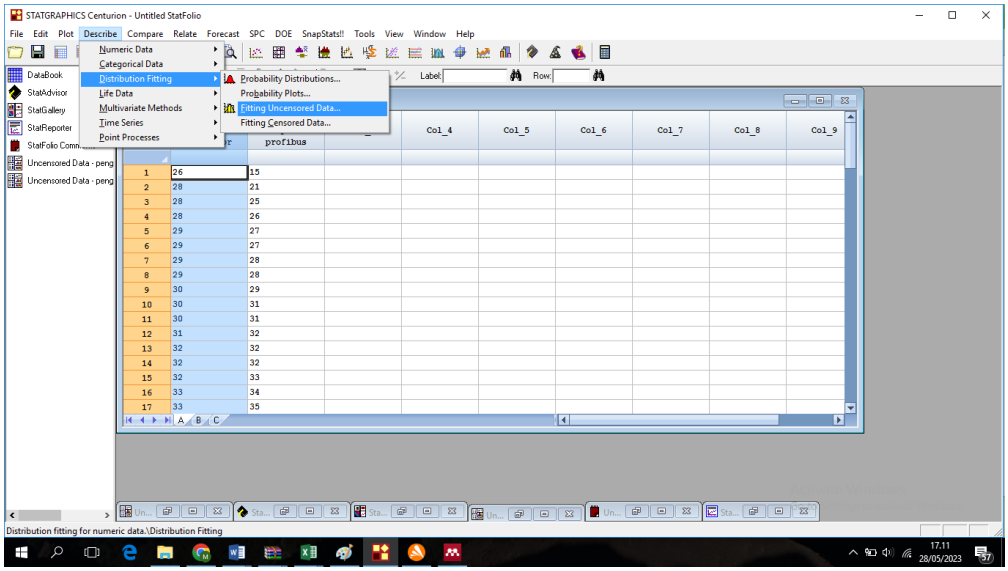
28/05/2023


STATGRAPHICS Centurion - Untitled StatFolio
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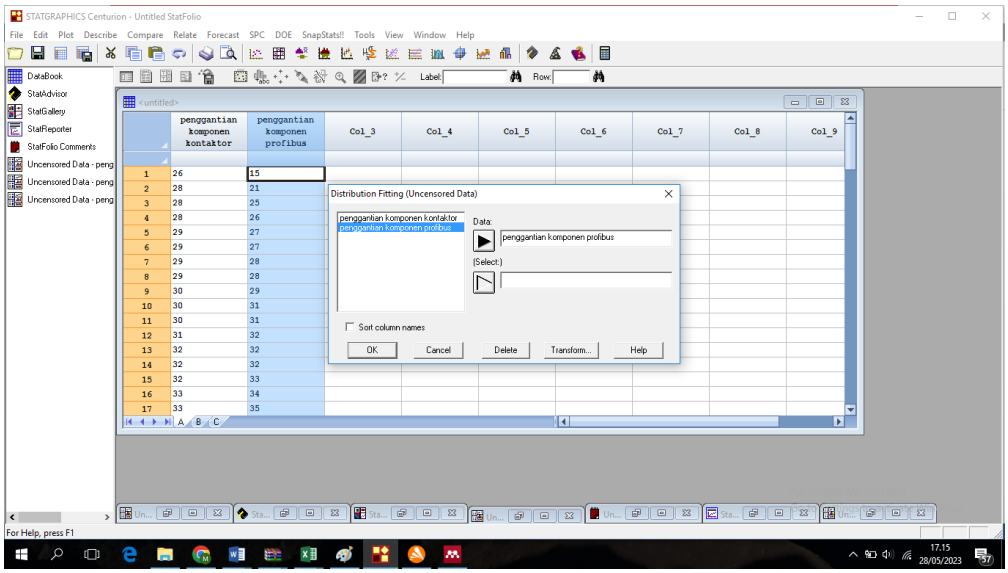
Numeric Data
Categorical Data
Distribution Fitting
Life Data
Multivariate Methods
Time Series
Point Processes
Probability Distributions...
Probability Plots...
Fitting Uncensored Data...
Fitting Censored Data...
Distribution fitting for numeric data.\Distribution Fitting
17.11
28/05/2023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Distribution Fitting (Uncensored Data)
penggantian komponen kontaktor
penggantian komponen profibus
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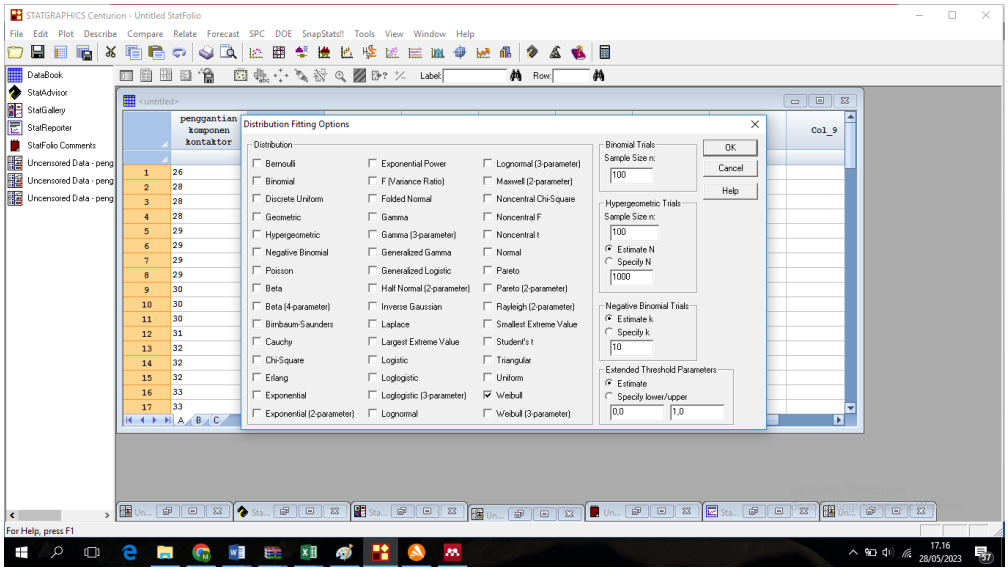
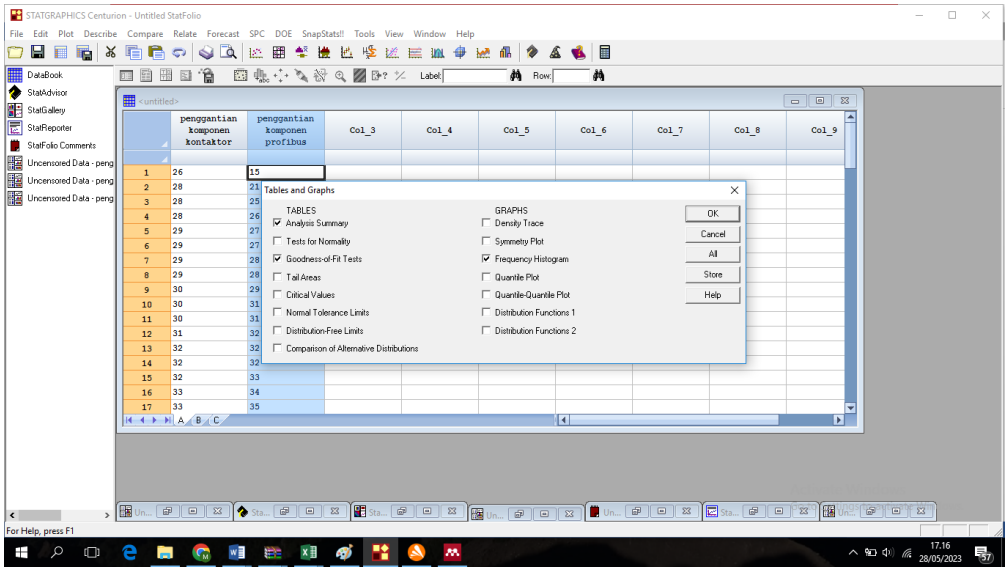
Sort column names
OK
Cancel
Delete
Transform...
Help
For Help, press F1
17.15
28/05/2023





Uncensored Data - penggantian komponen profibus

Data variable: penggantian komponen profibus

19 values ranging from 15,0 to 37,0

Fitted Distributions

Weibull
shape = 7,06135
scale = 31,5458

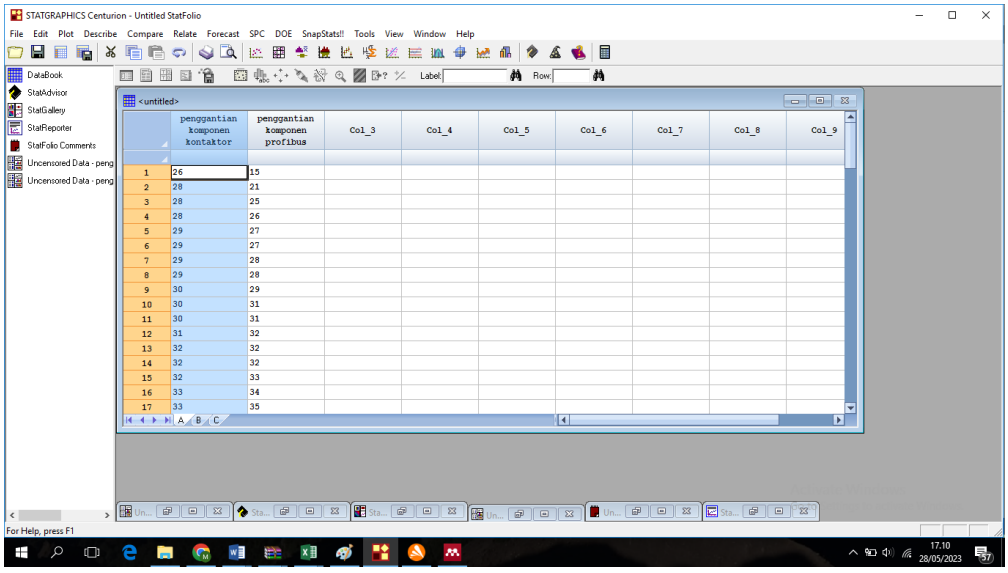
The StatAdvisor

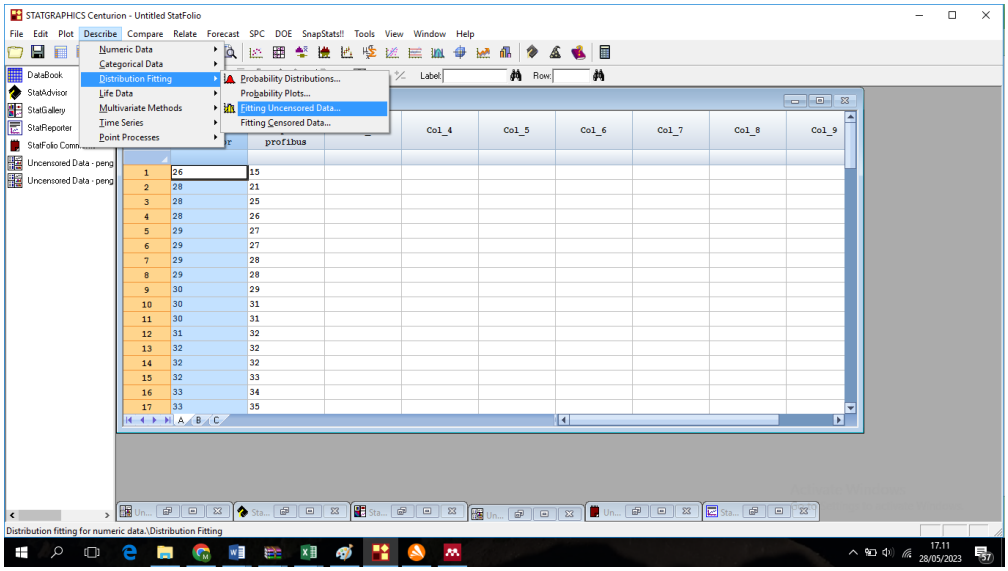
This analysis shows the results of fitting a Weibull distribution to the data on penggantian komponen profibus. The estimated parameters of the fitted distribution are shown above. You can test whether the Weibull distribution fits the data adequately by selecting Goodness-of-Fit Tests from the list of Tabular Options. You can also assess visually how well the Weibull distribution fits by selecting Frequency Histogram from the list of Graphical Options. Other options within the procedure allow you

to compute and display tail areas and critical values for the distribution. To select a different distribution, press the alternate mouse button and select Analysis Options.

i	Waktu Penggantian	$F(t) = 1 - e^{-(t/\beta)^{\alpha}}$	$D_n^- = \text{Max}\{F(t_i) - \frac{i-1}{n}\}$	$D_n^+ = \text{Max}\{\frac{i}{n} - F(t_i)\}$
1	15	0,0052	0,0052	-0,0608
2	21	0,0549	0,0216	0,0663
3	25	0,1760	0,1093	-0,0670
4	26	0,2253	0,1253	0,0649
5	27	0,2834	0,1501	-0,0627
6	27	0,2834	0,1168	0,0600
7	28	0,3501	0,1501	0,0578
8	28	0,3501	0,1167	-0,0550
9	29	0,4242	0,1575	0,0527
10	31	0,5869	0,2869	0,0509
11	31	0,5869	0,2536	-0,1923
12	32	0,6692	0,3025	-0,1828
13	32	0,6692	0,2692	-0,1717
14	32	0,6692	0,2359	-0,1606
15	33	0,7471	0,2804	-0,1509
16	34	0,8168	0,3168	-0,1411
17	35	0,8754	0,3421	-0,1312
18	37	0,9542	0,3875	0,1122
19	37	0,9542	0,3542	0,0278
		Max	**0,3875**	**0,1120**
		Dn	**0,1122**	

Hasil Output Stargraphies 18 Kontaktor

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Numeric Data
Categorical Data
Distribution Fitting
Life Data
Multivariate Methods
Time Series
Point Processes
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Probability Plots...
Fitting Uncensored Data...
Fitting Censored Data...
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StatGallery
StatReporter
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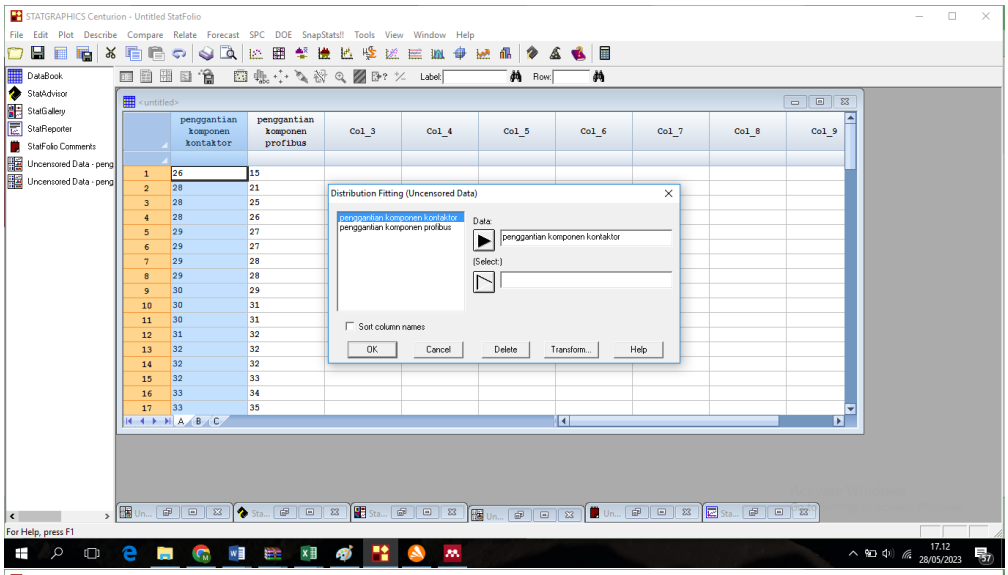
Distribution fitting for numeric data.\Distribution Fitting
17.11
28/05/2023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Distribution Fitting (Uncensored Data)
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Data:
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Sort column names
OK
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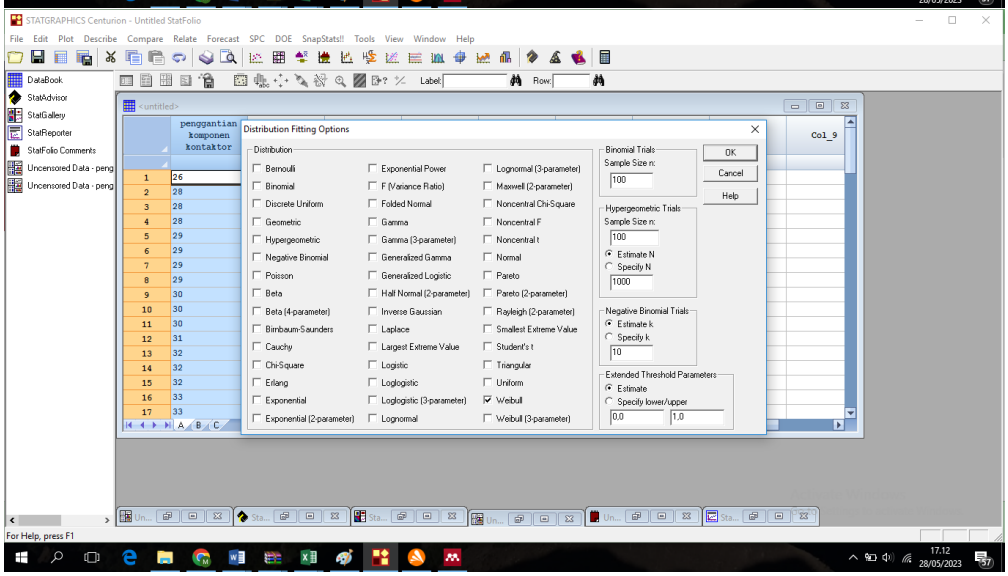
For Help, press F1
17.12
28/05/2023


STATGRAPHICS Centurion - Untitled StatFolio
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StatAdvisor
StatGallery
StatReporter
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penggantian komponen kontaktor
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Distribution Fitting Options
Distribution
Bernoulli
Binomial
Discrete Uniform
Geometric
Hypergeometric
Negative Binomial
Poisson
Beta
Beta (4-parameter)
Birnbaum-Saunders
Cauchy
Chi-Square
Erlang
Exponential
Exponential (2-parameter)
Exponential Power
F (Variance Ratio)
Folded Normal
Gamma
Gamma (3-parameter)
Generalized Gamma
Generalized Logistic
Half Normal (2-parameter)
Inverse Gaussian
Laplace
Largest Extreme Value
Logistic
Loglogistic
Loglogistic (3-parameter)
Lognormal
Lognormal (3-parameter)
Maxwell (2-parameter)
Noncentral Chi-Square
Noncentral F
Noncentral t
Normal
Pareto
Pareto (2-parameter)
Rayleigh (2-parameter)
Smallest Extreme Value
Student's t
Triangular
Uniform
Weibull
Weibull (3-parameter)
Binomial Trials
Sample Size n:
100
Hypergeometric Trials
Sample Size n:
100
Estimate N
Specify N
1000
Negative Binomial Trials
Estimate k
Specify k
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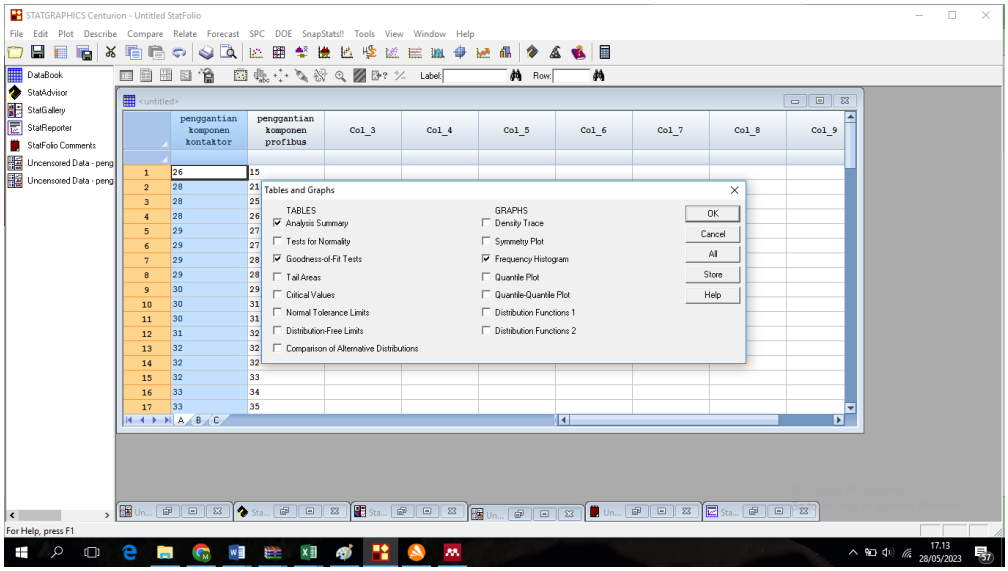
17.12
28/05/2023



Uncensored Data - penggantian komponen kontaktor

Data variable: penggantian komponen kontaktor

19 values ranging from 26,0 to 34,0

Fitted Distributions

Weibull
shape = 15,1374
scale = 31,4024

The StatAdvisor

This analysis shows the results of fitting a Weibull distribution to the data on penggantian komponen kontaktor. The estimated parameters of the fitted distribution are shown above. You can test whether the Weibull distribution fits the data adequately by selecting Goodness-of-Fit Tests from the list of Tabular Options. You can also assess visually how well the Weibull distribution fits by selecting Frequency Histogram from the list of Graphical Options. Other options within the procedure allow you to compute and display tail areas and critical values for the distribution. To select a different distribution, press the alternate mouse button and select Analysis Options.

Goodness-of-Fit Tests for penggantian komponen kontaktor

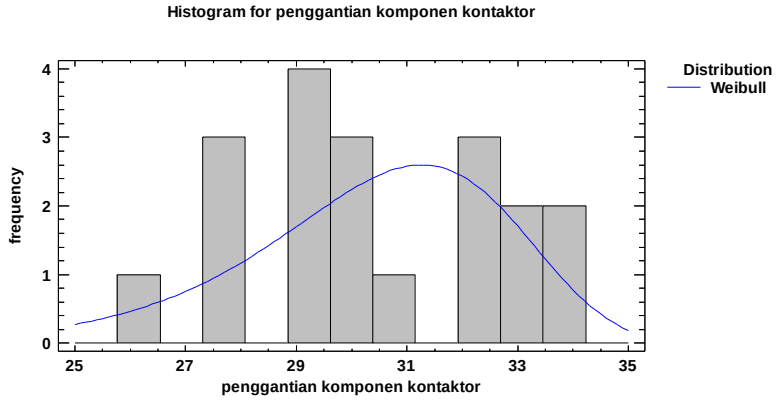
Kolmogorov-Smirnov Test

	Weibull
DPLUS	0,18501
DMINUS	0,108942
DN	0,18501
P-Value	0,550181

The StatAdvisor

This pane shows the results of tests run to determine whether penggantian komponen kontaktor can be adequately modeled by a Weibull distribution.

Since the smallest P-value amongst the tests performed is greater than or equal to 0,05, we can not reject the idea that penggantian komponen kontaktor comes from a Weibull distribution with 95% confidence.



i	Waktu penggantian	$F(t)=1-e^{-(t/\beta)^{\alpha}}$	$D_n^- = \text{Max}\{F(t_i)-\frac{i-1}{n}\}$	$D_n^+ = \text{Max}\{\frac{i}{n}-F(t_i)\}$
1	26	0,0558	0,0558	0,1796
2	28	0,1616	0,1282	-0,7593
3	28	0,1616	0,0949	0,0493
4	28	0,1616	0,0616	-0,2259
5	29	0,2590	0,1257	0,0387
6	29	0,2590	0,0923	-0,4720
7	29	0,2590	0,0590	-0,2054
8	29	0,2590	0,0257	0,0613
9	30	0,3939	0,1273	-0,7516
10	30	0,3939	0,0939	0,0485
11	30	0,3939	0,0606	0,0182
12	31	0,5607	0,1941	0,1819
13	32	0,7356	0,3356	-0,3023
14	32	0,7356	0,3023	-0,2689
15	32	0,7356	0,2689	-0,2356
16	33	0,8799	0,3799	0,0466
17	33	0,8799	0,3466	0,0132
18	34	0,9642	0,3976	-0,3642
19	34	0,9642	0,3642	-0,3309
		Max	**0,3976**	**0,1811**
		Dn	**0,1819**	

Hasil perhitungan Profibus dengan Exponential, Gamma, Normal, Weibull

Uncensored Data - penggantian komponen profibus

Data variable: penggantian komponen profibus

19 values ranging from 15,0 to 37,0

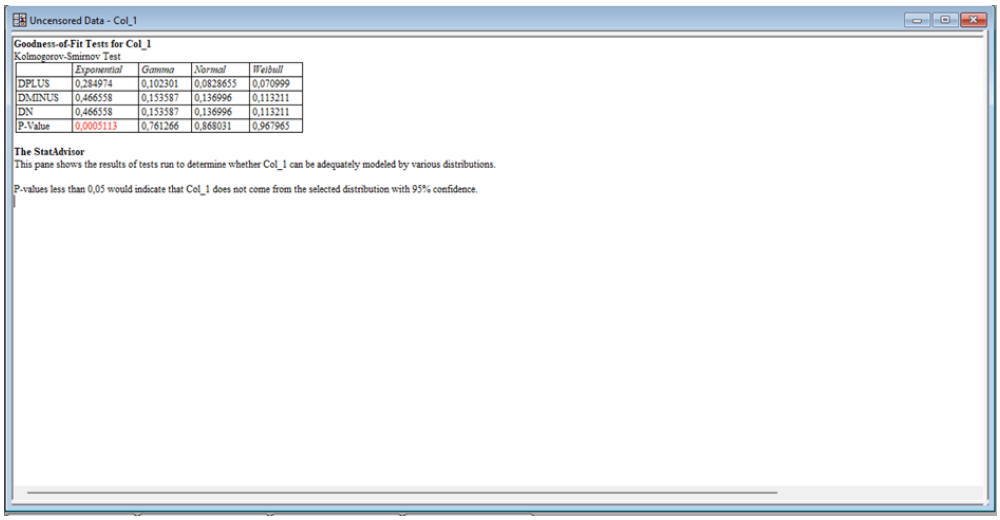
Fitted Distributions

Exponential	*Gamma*	*Normal*	*Weibull*

mean = 29,4737	shape = 25,9597	mean = 29,4737	shape = 7,06135
	scale = 0,880776	standard deviation = 5,43004	scale = 31,5458

The StatAdvisor

This analysis shows the results of fitting 4 distributions to the data on penggantian komponen profibus. The estimated parameters of the fitted distributions are shown above. You can test whether the distributions fit the data adequately by selecting Goodness-of-Fit Tests from the list of Tabular Options. You can also assess visually how well the distributions fit by selecting Frequency Histogram from the list of Graphical Options. Other options within the procedure allow you to compute and display tail areas and critical values for the distribution. To select a different distribution, press the alternate mouse button and select Analysis Options.


Uncensored Data - Col_1

Goodness-of-Fit Tests for Col_1

Kolmogorov-Smirnov Test

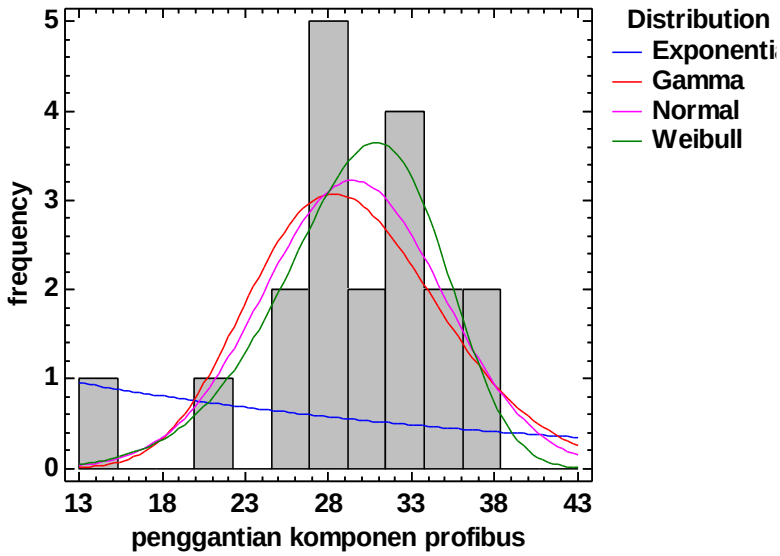
	Exponential	*Gamma*	*Normal*	*Weibull*
DPLUS	0,284974	0,102301	0,0828655	0,070999
DMINUS	0,466558	0,153587	0,136996	0,113211
DN	0,466558	0,153587	0,136996	0,113211
P-Value	0,0005113	0,761266	0,868031	0,967965

The StatAdvisor

This pane shows the results of tests run to determine whether Col_1 can be adequately modeled by various distributions.

P-values less than 0,05 would indicate that Col_1 does not come from the selected distribution with 95% confidence.

Histogram for penggantian komponen profibus



Parameter Distribusi Normal :
shape (α) = 29,4737
scale (β) = 5,43004

Parameter Distribusi Gamma :
shape (α) = 25,9597
scale (β) = 0,880776

Perhitungan distribusi normal komponen profibus

i	Waktu Penggantian	$f(t)=\frac{1}{\sqrt{\pi\pi^2}}e^{-(t-\mu)^2/2\sigma^2}$	$D_n^- = \text{Max}\{F(t_i)-\frac{i-1}{n}\}$	$D_n^+ = \text{Max}\{\frac{i}{n}-F(t_i)\}$
1	15	0,0054	0,0052	-0,0708
2	21	0,0539	0,0316	0,0563
3	25	0,1860	0,1193	-0,0670
4	26	0,2253	0,1153	0,0639
5	27	0,2934	0,1501	-0,0627
6	27	0,2832	0,1178	0,0601
7	28	0,3501	0,1501	0,0578
8	28	0,3501	0,1167	-0,0550
9	29	0,4242	0,1575	0,0527
10	31	0,5869	0,2869	0,0309
11	31	0,5869	0,2536	-0,1723
12	32	0,6692	0,3025	-0,1825
13	32	0,6692	0,2592	-0,1717
14	32	0,6692	0,2359	-0,1306
15	33	0,7571	0,2814	-0,1809
16	34	0,8158	0,3168	-0,1311
17	35	0,8734	0,3441	-0,1212
18	37	0,9532	0,3875	0,1369
19	37	0,9642	0,3632	0,0478
		Max	**0,3875**	**0,1369**
		Dn	**0,1369**	

Perhitungan distribusi gamma komponen profibus

i	Waktu Penggantian	$f(t)=\frac{\beta^{-a}t^{a-1}e^{-(t/\beta t}}{\Gamma(a)}$	$D_n^- = \text{Max}\{F(t_i)-\frac{i-1}{n}\}$	$D_n^+ = \text{Max}\{\frac{i}{n}-F(t_i)\}$
1	15	0,0052	0,0055	-0,0505
2	21	0,0649	0,0316	0,0763
3	25	0,2760	0,1093	-0,0670
4	26	0,2253	0,1253	0,0549
5	27	0,2934	0,1501	-0,0627
6	27	0,2834	0,1168	0,0600
7	28	0,3401	0,1601	0,0678
8	28	0,3501	0,1167	-0,0550
9	29	0,4240	0,2675	0,0627
10	31	0,5869	0,2869	0,0509
11	31	0,5869	0,2516	-0,1925
12	32	0,6692	0,3125	-0,1828

i	Waktu Penggantian	$f(t)=\frac{\beta^{-a}t^{a-1}e^{-(t/\beta t}}{\Gamma(a)}$	$D_n^- = \text{Max}\{F(t_i)-\frac{i-1}{n}\}$	$D_n^+ = \text{Max}\{\frac{i}{n}-F(t_i)\}$
13	32	0,6692	0,2692	-0,1317
14	32	0,6792	0,2559	-0,1506
15	33	0,7471	0,2804	-0,1609
16	34	0,8168	0,3268	-0,1411
17	35	0,9754	0,3421	-0,1312
18	37	0,9442	0,3885	0,1535
19	37	0,9532	0,3542	0,0478
		Max	**0,3875**	**0,1535**
		Dn	**0,1535**	

Hasil perhitungan kontaktor dengan Exponential, Gamma, Normal, Weibull

Uncensored Data - penggantian komponen kontaktor

Data variable: penggantian komponen kontaktor

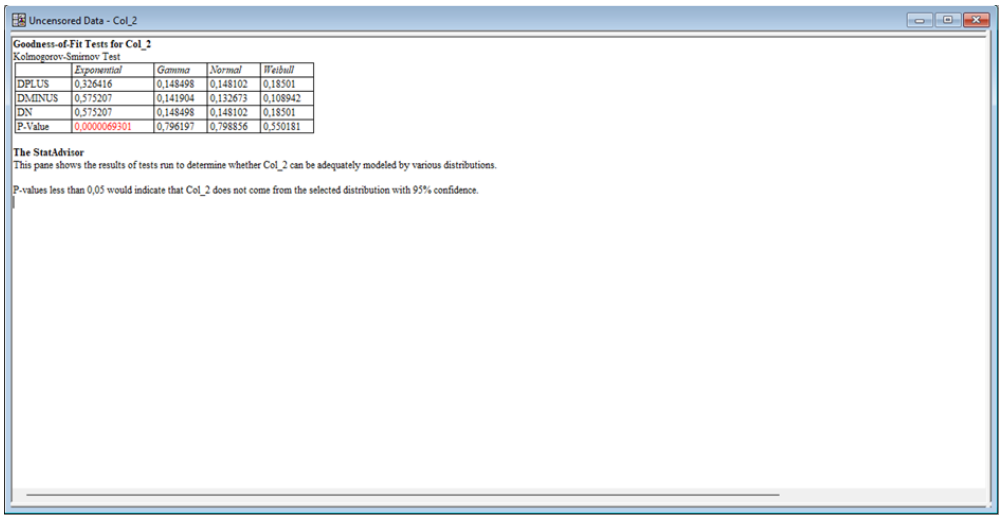
19 values ranging from 26,0 to 34,0

Fitted Distributions

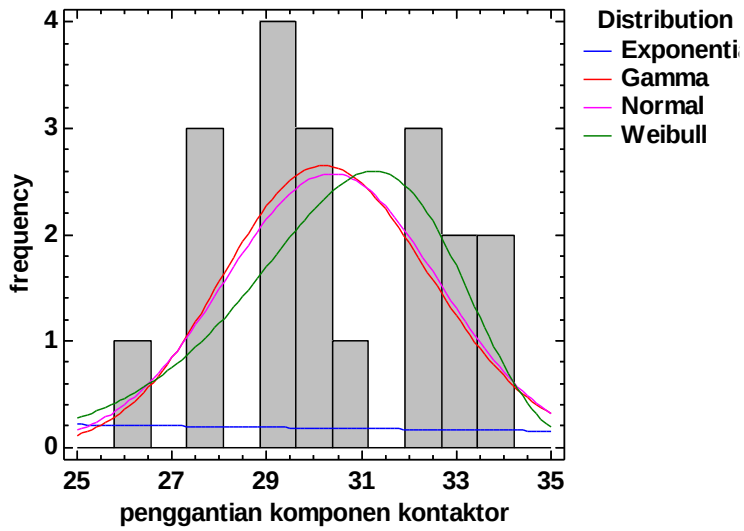
Exponential	*Gamma*	*Normal*	*Weibull*
mean = 30,3684	shape = 189,237	mean = 30,3684	shape = 15,1374
	scale = 6,23138	standard deviation = 2,26594	scale = 31,4024

The StatAdvisor

This analysis shows the results of fitting 4 distributions to the data on penggantian komponen kontaktor. The estimated parameters of the fitted distributions are shown above. You can test whether the distributions fit the data adequately by selecting Goodness-of-Fit Tests from the list of Tabular Options. You can also assess visually how well the distributions fit by selecting Frequency Histogram from the list of Graphical Options. Other options within the procedure allow you to compute and display tail areas and critical values for the distribution. To select a different distribution, press the alternate mouse button and select Analysis Options.



Histogram for penggantian komponen kontaktor



Parameter Distribusi Normal :
shape (α) = 30,3684
scale (β) = 2,26594

Parameter Distribusi Gamma :
shape (α) = 189,273
scale (β) = 6,23138

Perhitungan distribusi normal komponen kontaktor

i	Waktu penggantian	$f(t)=\frac{1}{\sqrt{\pi\pi^2}}e^{-(t-\mu)^2/2\sigma^2}$	$D_n^- = \text{Max}\{F(t_i)-\frac{i-1}{n}\}$	$D_n^+ = \text{Max}\{\frac{i}{n}-F(t_i)\}$
1	26	0,0538	0,0458	0,1896
2	28	0,1616	0,1282	-0,7583
3	28	0,1216	0,0949	0,0493
4	28	0,1616	0,0616	-0,2359
5	29	0,2590	0,1257	0,0387
6	29	0,2490	0,0923	-0,4720
7	29	0,2590	0,0590	-0,2054
8	29	0,2595	0,0257	0,0613
9	30	0,3939	0,1275	-0,7516
10	30	0,3939	0,0940	0,0485
11	30	0,3939	0,0606	0,0282
12	31	0,5607	0,1941	0,1461
13	32	0,7356	0,3356	-0,3023
14	32	0,7356	0,3023	-0,2689
15	32	0,7356	0,2689	-0,2356
16	33	0,8799	0,3779	0,0466
17	33	0,8799	0,3466	0,0132
18	34	0,9645	0,3976	-0,3642
19	34	0,9642	0,3642	-0,3309

i	Waktu penggantian	$f(t)=\frac{1}{\sqrt{\pi\pi^2}}e^{-(t-\mu)^2/2\sigma^2}$	$D_n^- = \text{Max}\{F(t_i)-\frac{i-1}{n}\}$	$D_n^+ = \text{Max}\{\frac{i}{n}-F(t_i)\}$
		Max	**0,3976**	**0,1481**
		Dn	**0,1481**	

Perhitungan distribusi gamma komponen kontaktor

i	Waktu penggantian	$f(t)=\frac{\beta^{-a}t^{a-1}e^{-(t/\beta t}}{\Gamma(a)}$	$D_n^- = \text{Max}\{F(t_i)-\frac{i-1}{n}\}$	$D_n^+ = \text{Max}\{\frac{i}{n}-F(t_i)\}$
1	26	0,0560	0,0558	0,1796
2	28	0,1616	0,1242	-0,7593
3	28	0,1616	0,0939	0,0493
4	28	0,1616	0,0626	-0,2259
5	29	0,2592	0,1247	0,0387
6	29	0,2592	0,0943	-0,4720
7	29	0,2592	0,0580	-0,2054
8	29	0,2592	0,0257	0,0613
9	30	0,3949	0,1273	-0,7516
10	30	0,3949	0,0939	0,0485
11	30	0,3949	0,0606	0,0182
12	31	0,5607	0,1941	0,1484
13	32	0,7356	0,3256	-0,3023
14	32	0,7356	0,3023	-0,2679
15	32	0,7356	0,2689	-0,2356
16	33	0,8799	0,3799	0,0466
17	33	0,8799	0,3466	0,0122
18	34	0,9642	0,3976	-0,3642
19	34	0,9642	0,3640	-0,3309
		Max	**0,3976**	**0,1484**
		Dn	**0,1484**	

Tabel Fungsi Gamma

n	$\Gamma(n)$	n	$\Gamma(n)$	n	$\Gamma(n)$	n	$\Gamma(n)$	n	$\Gamma(n)$
1,00	1,000000	1,20	0,918169	1,40	0,887264	1,60	0,893516	1,80	0,931384
1,01	0,994326	1,21	0,915577	1,41	0,886764	1,61	0,894681	1,81	0,934076
1,02	0,988844	1,22	0,913106	1,42	0,886356	1,62	0,895924	1,82	0,936845
1,03	0,983550	1,23	0,910735	1,43	0,886036	1,63	0,897244	1,83	0,939690
1,04	0,978438	1,24	0,918521	1,44	0,885805	1,64	0,898642	1,84	0,942612
1,05	0,973504	1,25	0,916403	1,45	0,885661	1,65	0,900117	1,85	0,945611
1,06	0,968744	1,26	0,914397	1,46	0,885604	1,66	0,901668	1,86	0,948687
1,07	0,964152	1,27	0,912503	1,47	0,885633	1,67	0,903296	1,87	0,951840
1,08	0,959725	1,28	0,910719	1,48	0,885747	1,68	0,905001	1,88	0,955071
1,09	0,955459	1,29	0,899042	1,49	0,885945	1,69	0,906782	1,89	0,958380
1,10	0,951351	1,30	0,897471	1,50	0,886227	1,70	0,908639	1,90	0,961766
1,11	0,947395	1,31	0,896004	1,51	0,886592	1,71	0,910572	1,91	0,965231
1,12	0,943590	1,32	0,894640	1,52	0,887039	1,72	0,912580	1,92	0,968774
1,13	0,939931	1,33	0,893378	1,53	0,887568	1,73	0,914665	1,93	0,972397
1,14	0,936416	1,34	0,892215	1,54	0,888178	1,74	0,916826	1,94	0,976099
1,15	0,933041	1,35	0,891151	1,55	0,888869	1,75	0,919062	1,95	0,979881
1,16	0,929803	1,36	0,890184	1,56	0,889639	1,76	0,921375	1,96	0,983742
1,17	0,926700	1,37	0,889313	1,57	0,890490	1,77	0,923763	1,97	0,987685
1,18	0,923728	1,38	0,888537	1,58	0,891420	1,78	0,926227	1,98	0,991708
1,19	0,920885	1,39	0,887854	1,59	0,892428	1,79	0,928767	1,99	0,995813
1,20	0,918169	1,40	0,887264	1,60	0,893516	1,80	0,931384	2,00	1,000000

Cara perhitungan nilai fungsi Gamma dengan menggunakan tabel fungsi Gamma :

Jika 0 < n < 1, maka $\Gamma(n) = \frac{\Gamma(n+1)}{n}$

Jika n > 0, dan n bilangan real, maka $\Gamma(n+1) = n\Gamma(n)$

Jika n > 0 dan n bilangan bulat positip, maka $\Gamma(n) = (n-1)!$

Jika n = 0,5, maka $\Gamma(n) = \sqrt{\pi}$

Distribusi Eksponensial

Fungsi padat probabilitas $f(t) = \frac{1}{\beta} e^{-t/\beta}$ dengan t ≥ 0

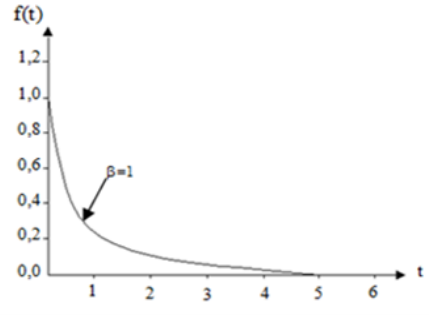
Fungsi distribusi kumulatif $F(t) = 1 - e^{-t/\beta}$ dengan t ≥ 0

Parameter : β

Rata – rata (Mean) : β

Varians : β^2

Penduga : $\beta = \bar{t}$



Distribusi Weibull

Fungsi padat probabilitas

$f(t) = \alpha\beta^{-\alpha} t^{\alpha-1} e^{-(t/\beta)^{\alpha}}$ dengan t ≥ 0

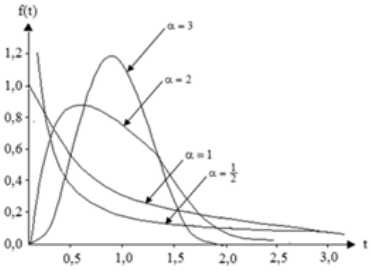
Fungsi distribusi kumulatif

$F(t) = 1 - e^{-(t/\beta)^{\alpha}}$ dengan t ≥ 0

Parameter: bentuk (α) dan skala (β)

Rata – rata (Mean) : $(\frac{\beta}{\alpha})(\Gamma(\frac{1}{\alpha}))$

Varians $(\frac{\beta^2}{\alpha})\{2\,\Gamma(\frac{2}{\alpha}) - (\frac{1}{\alpha})[\Gamma(\frac{1}{\alpha})]^2\}$



Distribusi Gamma

Fungsi padat probabilitas

$f(t) = \frac{\beta^{-\alpha} t^{\alpha-1} e^{-(t/\beta)}}{\Gamma(\alpha)}$ dengan t ≥ 0

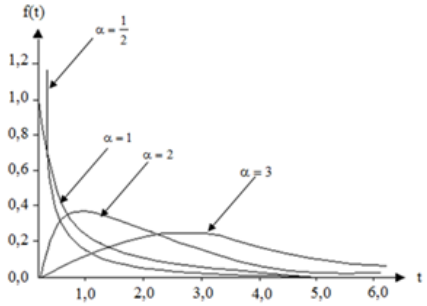
Fungsi distribusi kumulatif

$F(t) = 1 - e^{-(t/\beta)} \sum_{j=0}^{\alpha-1} \frac{(t/\beta)^j}{j!}$ dengan t ≥ 0

Parameter: bentuk (α) dan skala (β)

Rata – rata (Mean) : $\alpha\beta$

Varians : $\alpha\beta^2$



Distribusi Normal

Fungsi padat probabilitas $f(t) = \frac{1}{\sqrt{2\pi\sigma^2}} e^{-(t-\mu)^2/2\sigma^2}$

Fungsi distribusi kumulatif $z = \frac{t-\mu}{\sigma/\sqrt{n}}$ dengan z ~ N(0,1)

Parameter : lokasi $\mu \in (-\infty, \infty)$ dan skala ($\sigma > 0$)

Rata – rata (Mean) : μ

Varians : σ^2