

BAB 6

KESIMPULAN DAN SARAN

6.1. Kesimpulan

Berdasarkan hasil penelitian, dapat disimpulkan hal-hal sebagai berikut :

- a. Kontrak perawatan (*service contract*) mirip dengan perpanjangan garansi, dimana ada pihak luar (produsen atau dealer atau pihak ke-3) yang sanggup merawat produk untuk periode tertentu berdasarkan kontrak dengan pemilik produk. Sehingga model perpanjangan garansi 2 dimensi yang dilihat dari sudut pandang produsen (dealer atau pihak ke-3) dapat juga digunakan sebagai model untuk estimasi ongkos kontrak perawatan.
- b. Estimasi ongkos kontrak perawatan per unit sepeda motor untuk alternatif 1 (batas pemakaian 10.000 km dan batas umur produk 1 tahun) adalah Rp.324,29, untuk alternatif 2 (batas umur produk 1 tahun dan pemakaian tidak dibatasi) adalah Rp.407,70, dan untuk alternatif 3 (batas pemakaian 10.000 km dan umur produk tidak dibatasi) adalah Rp.1.134,24.
- c. Berdasarkan alternatif yang diberikan, alternatif yang paling menguntungkan bagi produsen adalah alternatif 3, sedangkan alternatif yang paling menguntungkan bagi konsumen adalah alternatif 2 dan alternatif 3.

- d. Semua alternatif kebijakan kontrak perawatan (alternatif 1, 2, dan 3) memberikan ongkos kontrak perawatan yang relatif murah. Sehingga produsen sebaiknya memilih alternatif 3 untuk ditawarkan kepada konsumen, karena pada umumnya konsumen akan lebih cenderung untuk memilih pelayanan tanpa batasan waktu atau umur.
- e. Penerapan kontrak perawatan menarik bagi konsumen karena murah, sehingga akan lebih menguntungkan jika produsen (*dealer* atau pihak ke-3) memberikan layanan tambahan berupa kontrak perawatan untuk setiap penjualan unit sepeda motor.

6.2. Saran

Saran yang bisa diberikan penulis untuk penelitian selanjutnya adalah mengembangkan penelitian kontrak perawatan untuk beberapa tipe sepeda motor selain tipe NF100 dengan merek dan hasil produksi perusahaan yang sama. Hal ini bertujuan agar konsumen sepeda motor tipe yang lain dengan merek yang sama dapat juga melakukan kontrak perawatan, sehingga tidak terbatas untuk 1 tipe saja.

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Lampiran

Lampiran 1

Data Mentah Klaim Garansi Sepeda Motor Tipe NF100 (contoh data)

BUY DATE	CLAIM DATE	AGE	PART NUMB.	PART NAME	ENGINE TYPE	DESCRIPTION	QTY	PRICE	SERVICE	HSO DATE	KM
	1/7/1998		35010KEV950	KEY SET	KEVFE	Hubungan Tersambung Terus	001	0	4600	9/11/1997	2083
12/5/1998	2/7/1998	-301	35010KEV950	KEY SET	KEVFE	Tertahan/Macet	1	0	4600	12/20/1997	4220
12/5/1998	2/7/1998	-301	44200L01FM0	LOCK,WHEEL	KEVFE	Tertahan/Macet	1	0	0		0
9/5/1998	2/7/1998	-210	88110KEVFM0	MIRROR ASSY, R	KEVFE	Lepas/Kendor	1	0	0	11/13/1997	3000
8/6/1998	2/7/1998	-180	88120KEVFM0	MIRROR,ASSY. L	KEVFE	Salah Pasang Part/Tertukar	1	0	0		0
8/6/1998	2/7/1998	-180	88120KEVFM0	MIRROR,ASSY. L	KEVFE	Salah Pasang Part/Tertukar	1	0	0		0
8/5/1998	2/7/1998	-179	35010KEV950	KEY SET	KEVFE	Tertahan/Macet	1	0	4600	11/4/1998	506
7/6/1998	2/7/1998	-149	44200L01FM0	LOCK,WHEEL	KEVFE	Tertahan/Macet	1	0	0		0
7/6/1998	2/7/1998	-149	44200L01FM0	LOCK,WHEEL	KEVFE	Tertahan/Macet	1	0	0		0
7/6/1998	2/7/1998	-149	44200L01FM0	LOCK,WHEEL	KEVFE	Tertahan/Macet	1	0	0		0
7/5/1998	2/7/1998	-148	52400KEV880	CUSHION ASSY,RR	KEVFE	Bocor	1	0	3100	3/28/1998	2150
7/5/1998	2/7/1998	-148	18350KEV880	MUFFLER COMP,EX	KEVFE	Berkarat/Korosi	1	0	0	12/14/1997	3567
6/6/1998	2/7/1998	-119	35010KEV950	KEY SET	KEVFE	Berkarat/Korosi	1	0	0		0
5/29/1998	2/7/1998	-111	52400KEV880	CUSHION ASSY,RR	KEVFE	Bocor	1	0	3100	9/5/1998	494
5/29/1998	2/7/1998	-111	35010KEV950	KEY SET	KEVFE	Hubungan Tersambung Terus	1	0	4600	10/1/1998	3541
5/29/1998	2/7/1998	-111	44200L01FM0	LOCK,WHEEL	KEVFE	Tertahan/Macet	1	0	0		0
5/29/1998	2/7/1998	-111	44200L01FM0	LOCK,WHEEL	KEVFE	Tertahan/Macet	1	0	0		0
5/28/1998	2/7/1998	-110	88110KEVFM0	MIRROR ASSY, R	KEVFE	Lepas/Kendor	1	0	0	3/1/1998	3242
5/28/1998	2/7/1998	-110	88120KEVFM0	MIRROR,ASSY. L	KEVFE	Lepas/Kendor	1	0	0	3/1/1998	3242
5/27/1998	2/7/1998	-109	14711GN5912	14711GN5913	KEVFE	Bengkok	1	0	0	1/12/1997	1205
5/27/1998	2/7/1998	-109	FMB6301	BEARING, RADIAL BALL, 6301	KEVFE		2	0	0	3/24/1998	2010
5/27/1998	2/7/1998	-109	42620GB6920	COLLAR REAR AXLE	KEVFE		1	0	0	3/24/1998	2010
5/27/1998	2/7/1998	-109	12101GN5910	CYLINDER COMP.	KEVFE	Bocor	1	0	17600		0
5/27/1998	2/7/1998	-109	41241GB4770	DAMPER SET, RR.	KEVFE		1	0	0	3/24/1998	2010
5/27/1998	2/7/1998	-109	42601GN5960FMS	HUB,RR.WHEEL	KEVFE		1	0	0	3/24/1998	2010
5/27/1998	2/7/1998	-109	44200L01FM0	LOCK,WHEEL	KEVFE	Tertahan/Macet	1	0	0		0

BUY DATE	CLAIM DATE	AGE	PART NUMB.	PART NAME	ENGINE TYPE	DESCRIPTION	QTY	PRICE	SERVICE	HSO DATE	KM
5/27/1998	2/7/1998	-109	43100GN5830FMS	PANEL,RR.BRAKE	KEVFE		1	0	0	3/24/1998	2010
5/27/1998	2/7/1998	-109	45120001010	SHOE BRAKE SET	KEVFE		1	0	0	3/24/1998	2010
5/27/1998	2/7/1998	-109	37200KEV950	SPEEDOMETER ASSY	KEVFE	Alat Pembaca Tidak Akurat	1	0	2600	1/12/1997	1205
5/27/1998	2/7/1998	-109	45133028000	SPRING BRAKE SHOE	KEVFE	Lepas/Kendor	1	0	0	3/24/1998	2010
5/27/1998	2/7/1998	-109	35200KEV950	SWITCH ASSY,WINKE	KEVFE	Lepas/Kendor	1	0	4200	4/27/1998	504
5/26/1998	2/7/1998	-108	11330KEV880	COVER, R. CRANK	KEVFE	Retak	1	0	5000	6/3/1998	2400
5/26/1998	2/7/1998	-108	91202302010H	S 13.8X24X5	KEVFE		1	0	0	6/3/1998	2400
5/25/1998	2/7/1998	-107	17620GA7023	CAP,FUEL FILLER	KEVFE	Lepas/Kendor	1	0	0	1/15/1998	3786
5/24/1998	2/7/1998	-106	35010KEV950	KEY SET	KEVFE	Tertahan/Macet	1	0	4600	4/20/1998	2150
5/23/1998	2/7/1998	-105	52400kev880	CUSHION ASSY,RR	KEVFE	Kerusakan Pada Pelapisan (Plat	1	0	3100	3/24/1998	2481
5/23/1998	2/7/1998	-105	15651GN5912	GAUGE OIL LEVEL	KEVFE	Salah Pasang/Setel	1	0	0	6/5/1998	105
5/22/1998	2/7/1998	-104	25SH-84	CHAIN,CAM	KEVFE	Usang/Aus	1	0	6600	8/1/1998	4627
5/22/1998	2/7/1998	-104	14610086003H	GUIDE,CAM CHAIN	KEVFE		1	0	0	8/1/1998	4627
5/22/1998	2/7/1998	-104	44200L01FM0	LOCK,WHEEL	KEVFE	Tertahan/Macet	1	0	0		0
5/21/1998	2/7/1998	-103	35010KEV950	KEY SET	KEVFE	Hubungan Tersambung Terus	1	0	4600	4/29/1998	325
5/20/1998	2/7/1998	-102	52400KEV880	CUSHION ASSY,RR	KEVFE	Lemah (Efisiensi Berkurang)	1	0	3100	1/19/1998	3997
5/20/1998	2/7/1998	-102	88110GN5780	MIRROR R.BACK 1	KEVFE	Salah Pasang Part/Tertukar	1	0	0		0
5/19/1998	2/7/1998	-101	35010KEV950	KEY SET	KEVFE	Tertahan/Macet	1	0	3100	11/3/1998	2120
5/18/1998	2/7/1998	-100	12101GN5910	CYLINDER COMP.	KEVFE	Bocor	1	0	17600	11/5/1998	423
5/18/1998	2/7/1998	-100	061A1GF6912H	GASKET KIT A	KEVFE		1	0	0	11/5/1998	423
5/17/1998	2/7/1998	-99	35010KEV950	KEY SET	KEVFE	Ulir Aus/Dos	1	0	4600	9/12/1997	1545
5/14/1998	2/7/1998	-96	35010KEV950	KEY SET	KEVFE	Macet Karena Seret	1	0	4600	12/1/1998	4500
5/13/1998	2/7/1998	-95	52400KEV880	CUSHION ASSY,RR	KEVFE	Bengkok	1	0	3100	1/2/1998	4300
5/4/1998	2/7/1998	-86	35010KEV950	KEY SET	KEVFE	Korsluiting	1	0	4800	10/11/1997	3800
4/30/1998	2/7/1998	-82	44200L01FM0	LOCK,WHEEL	KEVFE	Tertahan/Macet	1	0	0		0
4/28/1998	2/7/1998	-80	30400KEV880	CDI UNIT	KEVFE	Mesin Mati Tiba-tiba	1	0	2000	1/16/1998	3420
4/28/1998	2/7/1998	-80	44200L01FM0	LOCK,WHEEL	KEVFE	Tertahan/Macet	1	0	0		0
4/25/1998	2/7/1998	-77	38301GN5780	RELAY,WINKER 1	KEVFE	Korsluiting	1	0	1000	12/18/1997	3870
4/22/1998	2/7/1998	-74	35010KEV950	KEY SET	KEVFE	Tertahan/Macet	1	0	4600	12/19/1997	3115
4/21/1998	2/7/1998	-73	18350KEV880	MUFFLER COMP,EX	KEVFE	Berkarat/Korosi	1	0	0	10/30/1997	2500
4/15/1998	2/7/1998	-67	44200L01FM0	LOCK,WHEEL	KEVFE	Tertahan/Macet	1	0	0		0

BUY DATE	CLAIM DATE	AGE	PART NUMB.	PART NAME	ENGINE TYPE	DESCRIPTION	QTY	PRICE	SERVICE	HSO DATE	KM
4/5/1998	2/7/1998	-57	52400KEV880	CUSHION ASSY,RR	KEVFE	Lemah (Efisiensi Berkurang)	1	0	3100	3/28/1998	1798
3/14/1998	2/7/1998	-35	35200KEV950	SWITCH ASSY,WINKE	KEVFE	Macet Karena Seret	1	0	4200	12/13/1997	3535
2/6/1998	2/7/1998	1	12361035000	CAP, TAPPET	KEVFE	Berkarat/Korosi	1	0	0	1/4/1998	4000
1/5/1998	2/7/1998	33	88110KEVFM0	MIRROR ASSY, R	KEVFE	Oblag/Terlalu Banyak Main	1	0	0	3/11/1997	5120
1/5/1998	2/7/1998	33	18350KEV880	MUFFLER COMP,EX	KEVFE	Berkarat/Korosi	1	0	0	3/11/1997	5120
1/2/1998	2/16/1998	45	38300KEV950	RELAY ASSY,WINKER	KEVFE	Korsluiting	1	22600	0	11/4/1997	1998
1/1/1998	2/16/1998	46	12101GN5910	CYLINDER COMP.	KEVFE	Bocor	1	248800	16000	10/17/1997	1216
1/1/1998	2/16/1998	46	061A1GF6912H	GASKET KIT A	KEVFE	Usang/Aus	1	62400	0	10/17/1997	1216
1/7/1998	2/18/1998	42	14100GN5911	14100GN5912	KEV		1	184200	0	12/18/1997	358
1/7/1998	2/18/1998	42	14431GN5911	ARM,VALVE ROCKER	KEV		2	0	17600	12/18/1997	358
1/5/1998	2/18/1998	44	80101KEV880	FENDER,RR INNER	KEVFE	Sobek	1	7500	2200	8/21/1997	4051
1/5/1998	2/18/1998	44	44806GN5901	GEAR SPEEDOMETER	KEVFE	Patah	1	22100	2200	12/12/1997	400
1/4/1998	2/18/1998	45	80101KEV880	FENDER,RR INNER	KEVFE	Tergores	1	0	2200	11/15/1997	1333
1/3/1998	2/18/1998	46	52400KEV880	CUSHION ASSY,RR	KEVFE	Bocor	2	72200	3100	11/18/1997	1850
1/8/1998	2/19/1998	42	35010KEV950	KEY SET	KEVFE	Macet Karena Seret	1	0	4600	12/9/1997	32
1/5/1998	2/19/1998	45	35010KEV950	KEY SET	KEVFE	Macet Karena Seret	1	0	4600	12/1/1997	38
1/3/1998	2/19/1998	47	41241GB4770	DAMPER SET, RR.	KEVFE	Lemah (Efisiensi Berkurang)	1	2600	2200	11/29/1997	1680
1/10/1998	2/20/1998	41	35010KEV950	KEY SET	KEVFE	Korsluiting	1	58500	4600	11/13/1997	474
1/8/1998	2/20/1998	43	30410GN5831	CDI UNIT	KEVFE	Korsluiting	1	139400	0	12/15/1997	928
1/6/1998	2/20/1998	45	061A1GF6912H	GASKET KIT A	KEV	Bocor	1	62400	17600	11/22/1997	1823
1/4/1998	2/20/1998	47	35010KEV950	KEY SET	KEVFE	Korsluiting	1	0	4600	11/29/1997	1555
1/3/1998	2/20/1998	48	38110GB6921	HORN COMP	KEVFE	Korsluiting	1	19400	0	12/20/1997	500
1/3/1998	2/20/1998	48	35010KEV950	KEY SET	KEVFE	Hubungan Terputus	1	58500	4200	12/4/1997	1488
1/2/1998	2/20/1998	49	GM5Z-3B	BATTERY GN5	KEV	Sel Battery Mati	1	23300	0	10/18/1997	2311
	2/20/1998		80101KEV880	FENDER,RR INNER	KEV	Sobek	1	0	0	9/17/1997	5643
1/19/1998	2/25/1998	37	9610063010	BEARING 6301	KEVFE	Longgar/Renggang	2	0	2500	9/20/1997	1960
1/16/1998	2/25/1998	40	64430KEV900FMB	COVER R FR BLACK	KEVFE	Patah	1	0	0	12/11/1997	530
1/16/1998	2/25/1998	40	88110KEVFM0	MIRROR ASSY, R	KEVFE	Longgar/Renggang	1	16200	0	11/18/1997	508
1/15/1998	2/25/1998	41	88110KEVFM0	MIRROR ASSY, R	KEVFE	Lain-lain	1	16200	0	11/7/1997	1124
1/15/1998	2/25/1998	41	88110KEVFM0	MIRROR ASSY, R	KEVFE	Lain-lain	1	16200	0	11/6/1997	2000
1/15/1998	2/25/1998	41	88120KEVFM0	MIRROR,ASSY. L	KEVFE	Lain-lain	1	16200	0	11/7/1997	1124

Lampiran 2

Data Klaim Garansi Sepeda Motor Tipe NF100 Setelah Diolah (contoh data)

BUY DATE	CLAIM DATE	AGE	PART NUMB.	PART NAME	ENGINE TYPE	DESCRIPTION	QTY	PRICE	SERVICE	KM	LAJU PENGGUNAAN
3/6/1998	3/7/1998	1	45100GN5830FMS	PANEL,FR.BRAKE	KEVFE	Patah	1	0	0	1	1.00
2/23/1998	3/10/1998	15	GM5Z-3B	BATTERY GN5	KEVFE	Sel Battery Mati	1	23300	0	3100	206.67
2/23/1998	3/10/1998	15	88110KEVFM0	MIRROR ASSY, R	KEVFE	Lepas/Kendor	1	16200	0	500	33.33
2/23/1998	3/10/1998	15	88120KEVFM0	MIRROR,ASSY. L	KEVFE	Lepas/Kendor	1	16200	0	2628	175.20
5/25/1998	6/2/1998	8	52400KEV880	CUSHION ASSY,RR	KEVFE	Lemah (Efisiensi Berkurang)	1	72200	3100	2048	256.00
7/5/1998	7/7/1998	2	35010KEV950	KEY SET	KEVFE	Tertahan/Macet	1	0	4800	885	442.50
7/3/1998	7/7/1998	4	35010KEV950	KEY SET	KEVFE	Hubungan Tersambung Terus	1	0	4600	443	110.75
7/5/1998	7/13/1998	8	64330KEV880FMI	COVER,R BODY(PURP	KEVFE	Patah	1	0	0	300	37.50
7/5/1998	7/13/1998	8	871X0KEV880ZF	STRIPPING SET 6	KEVFE		1	0	0	300	37.50
1/5/1998	2/7/1998	33	88110KEVFM0	MIRROR ASSY, R	KEVFE	Oblag/Terlalu Banyak Main	1	0	0	5120	155.15
1/5/1998	2/7/1998	33	18350KEV880	MUFFLER COMP,EX	KEVFE	Berkarat/Korosi	1	0	0	5120	155.15
1/2/1998	2/16/1998	45	38300KEV950	RELAY ASSY,WINKER	KEVFE	Korsluiting	1	22600	0	1998	44.40
1/7/1998	2/18/1998	42	14100GN5911	14100GN5912	KEV		1	184200	0	358	8.52
1/7/1998	2/18/1998	42	14431GN5911	ARM,VALVE ROCKER	KEV		2	0	17600	358	8.52
1/5/1998	2/18/1998	44	80101KEV880	FENDER,RR INNER	KEVFE	Sobek	1	7500	2200	4051	92.07
1/5/1998	2/18/1998	44	44806GN5901	GEAR SPEEDOMETER	KEVFE	Patah	1	22100	2200	400	9.09
1/4/1998	2/18/1998	45	80101KEV880	FENDER,RR INNER	KEVFE	Tergores	1	0	2200	1333	29.62
1/8/1998	2/19/1998	42	35010KEV950	KEY SET	KEVFE	Macet Karena Seret	1	0	4600	32	0.76
1/5/1998	2/19/1998	45	35010KEV950	KEY SET	KEVFE	Macet Karena Seret	1	0	4600	38	0.84
1/10/1998	2/20/1998	41	35010KEV950	KEY SET	KEVFE	Korsluiting	1	58500	4600	474	11.56
1/8/1998	2/20/1998	43	30410GN5831	CDI UNIT	KEVFE	Korsluiting	1	139400	0	928	21.58

BUY DATE	CLAIM DATE	AGE	PART NUMB.	PART NAME	ENGINE TYPE	DESCRIPTION	QTY	PRICE	SERVICE	KM	LAJU PENGGUNAAN
1/6/1998	2/20/1998	45	061A1GF6912H	GASKET KIT A	KEV	Bocor	1	62400	17600	1823	40.51
1/19/1998	2/25/1998	37	9610063010	BEARING 6301	KEVFE	Longgar/Renggang	2	0	2500	1960	52.97
1/16/1998	2/25/1998	40	64430KEV900FMB	COVER R FR BLACK	KEVFE	Patah	1		0	530	13.25
1/16/1998	2/25/1998	40	88110KEVFM0	MIRROR ASSY, R	KEVFE	Longgar/Renggang	1	16200	0	508	12.70
1/15/1998	2/25/1998	41	88110KEVFM0	MIRROR ASSY, R	KEVFE	Lain-lain	1	16200	0	1124	27.41
1/15/1998	2/25/1998	41	88110KEVFM0	MIRROR ASSY, R	KEVFE	Lain-lain	1	16200	0	2000	48.78
1/15/1998	2/25/1998	41	88120KEVFM0	MIRROR,ASSY. L	KEVFE	Lain-lain	1	16200	0	1124	27.41
1/15/1998	2/25/1998	41	88120KEVFM0	MIRROR,ASSY. L	KEVFE	Lain-lain	1	16200	0	2000	48.78
1/12/1998	2/25/1998	44	90307001000	NUT, REAR AXLE	KEVFE		1	7800	0	3800	86.36
1/12/1998	2/25/1998	44	42303GN5830	SLEEVE AXLE	KEVFE	Ullir Aus/Dos	1	10700	0	3800	86.36
1/22/1998	2/26/1998	35	31600GAZ980	RECTIFIER REGULAT	KEVFE	Korsluiting	1		0	371	10.60
1/20/1998	2/26/1998	37	80101KEV880	FENDER,RR INNER	KEVFE	Sobek	1	0	0	500	13.51
1/19/1998	2/26/1998	38	80101KEV880	FENDER,RR INNER	KEVFE	Sobek	1	0	0	4000	105.26
1/19/1998	2/26/1998	38	51400KEV880	FORK ASSY,R FR	KEVFE	Bocor	1	205700	4000	2000	52.63
1/19/1998	2/26/1998	38	38110GN5961	HORN COMP	KEVFE	Korsluiting	1	12800	0	500	13.16
1/17/1998	2/26/1998	40	80101KEV880	FENDER,RR INNER	KEVFE	Sobek	1	0	0	1550	38.75
1/14/1998	2/26/1998	43	38110GN5961	HORN COMP	KEVFE	Korsluiting	1	12800	0	741	17.23
1/13/1998	2/26/1998	44	88120KEVFM0	MIRROR,ASSY. L	KEVFE	Lepas/Kendor	1	16200	0	442	10.05
1/13/1998	2/26/1998	44	17510KEV880	TANK ASSY,FUEL	KEVFE	Kerusakan Pada Las/Older	1	48100	2400	824	18.73
1/12/1998	2/26/1998	45	80101KEV880	FENDER,RR INNER	KEVFE	Sobek	1	7500	2200	3257	72.38
1/12/1998	2/26/1998	45	35010KEV950	KEY SET	KEVFE	Korsluiting	1	58500	4600	321	7.13
1/16/1998	2/27/1998	42	35010KEV950	KEY SET	KEVFE	Tertahan/Macet	1	0	4600	3540	84.29
2/13/1998	3/4/1998	19	35010KEV950	KEY SET	KEV	Korsluiting	1	0	4600	500	26.32
1/26/1998	3/4/1998	37	9.58011E+11	BOLT,FLANGE 10X45	KEV	Kesalahan Cetak	4	4000	9500	1000	27.03
1/22/1998	3/4/1998	41	17620GA7023	CAP,FUEL FILLER	KEV	Patah	1	0	0	225	5.49
1/22/1998	3/4/1998	41	83500KEV900FMB	COVER,R (BLACK)	KEV	Salah Pasang/Setel	1	0	5000	15	0.37

BUY DATE	CLAIM DATE	AGE	PART NUMB.	PART NAME	ENGINE TYPE	DESCRIPTION	QTY	PRICE	SERVICE	KM	LAJU PENGUNAAN
1/22/1998	3/4/1998	41	83500KEV900FMB	COVER,R (BLACK)	KEV	Salah Pasang/Se-el	1	0	500C	400	9.76
1/22/1998	3/4/1998	41	80101KEV880	FENDER,RR INNER	KEV	Kesalahan Cetak	1	7500	220C	200	4.88
1/21/1998	3/4/1998	42	12101GN5910	CYLINDER COMP.	KEV	Bocor	1	248800	0	10	0.24
1/21/1998	3/4/1998	42	061A1GF6912H	GASKET KIT A	KEV		1	62400	17800	10	0.24
1/20/1998	3/4/1998	43	35010KEV950	KEY SET	KEV	Korsluiting	1	58500	4600	728	16.93
1/19/1998	3/4/1998	44	12361035000	CAP, TAPPET	KEVFE	Uilir Aus/Dos	1	1400	0	500	11.36
1/19/1998	3/4/1998	44	17620GA7023	CAP,FUEL FILLER	KEV	Patah	1	0	0	1500	34.09
1/19/1998	3/4/1998	44	17620GA7023	CAP,FUEL FILLER	KEV	Patah	1	0	0	2000	45.45
1/19/1998	3/4/1998	44	80101KEV880	FENDER,RR INNER	KEV	Sobek	1	0	0	1000	22.73
1/19/1998	3/4/1998	44	35010KEV950	KEY SET	KEVFE	Korsluiting	1	58500	4600	14	0.32
1/24/1998	3/6/1998	41	80101KEV880	FENDER,RR INNER	KEVFE	Sobek	1	7500	0	901	21.98
1/22/1998	3/6/1998	43	45450KEV880	CABLE,FR BRAKE	KEVFE	Tertahan/Macet	1		0	4052	94.23
1/22/1998	3/6/1998	43	17620GA7023	CAP,FUEL FILLER	KEVFE	Patah	1	11800	0	4000	93.02
1/22/1998	3/6/1998	43	35200KEV950	SWITCH ASSY,WINKE	KEVFE	Korsluiting	1	87100	4200	4000	93.02
1/21/1998	3/6/1998	44	35010KEV950	KEY SET	KEVFE	Tertahan/Macet	1	58500	0	4936	112.18
1/21/1998	3/6/1998	44	35010KEV950	KEY SET	KEVFE	Tertahan/Macet	1	0	1	1298	29.50
1/21/1998	3/6/1998	44	35010KEV950	KEY SET	KEVFE	Tertahan/Macet	1	58500	4600	58	1.32
1/20/1998	3/6/1998	45	38110GN5961	HORN COMP	KEVFE	Korsluiting	1	12800	0	500	11.11
2/6/1998	3/7/1998	29	50100KEV880	BODY FRAME (BLACK	KEVFE	Bengkok	1	0	15000	250	8.62
2/6/1998	3/7/1998	29	35860GBG910	SWITCH,STARTER(5)	KEVFE	Hubungan Terputus	1	0	0	3982	137.31
2/18/1998	3/10/1998	20	52400KEV880	CUSHION ASSY,RR	KEVFE	Bocor	1	72200	3100	350C	175.00
2/16/1998	3/10/1998	22	35010KEV950	KEY SET	KEVFE	Tertahan/Macet	1	58500	4200	2000	90.91
2/16/1998	3/10/1998	22	35010KEV950	KEY SET	KEVFE	Korsluiting	1	58500	4200	500	22.73
2/16/1998	3/10/1998	22	88120KEVFM0	MIRROR,ASSY. L	KEVFE	Lepas/Kendor	1	16200	0	4180	190.00
2/16/1998	3/10/1998	22	88120KEVFM0	MIRROR,ASSY. L	KEVFE	Lepas/Kendor	1	16200	0	500	22.73
2/11/1998	3/10/1998	27	77200KEV880	SEAT COMP,DOUBLE	KEVFE	Patah	1	88900	0	2000	74.07

Lampiran 3
ARENA (LAJU PENGGUNAAN)



Distribution Summary

Distribution: Gamma
Expression: GAMM(34.5, 0.825)
Square Error: 0.001136

Chi Square Test

Number of intervals = 15
Degrees of freedom = 12
Test Statistic = 30.6
Corresponding p-value < 0.005

Kolmogorov-Smirnov Test

Test Statistic = 0.0223
Corresponding p-value = 0.0746

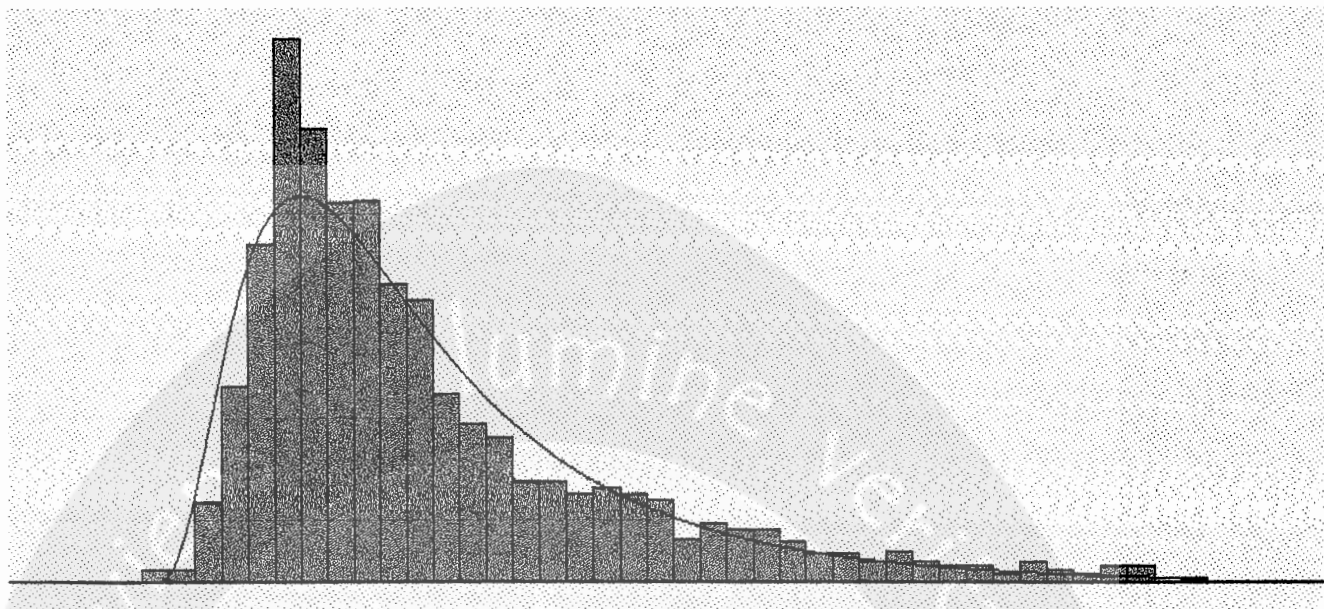
Data Summary

Number of Data Points = 3334
Min Data Value = 0.01
Max Data Value = 443
Sample Mean = 28.5
Sample Std Dev = 32.5

Histogram Summary

Histogram Range = 0 to 443
Number of Intervals = 40

Lampiran 4
ARENA (DATA UMUR)



Distribution Summary

Distribution: Lognormal
Expression: $0.999 + \text{LOGN}(83.7, 59.4)$
Square Error: 0.002642

Chi Square Test

Number of intervals = 34
Degrees of freedom = 31
Test Statistic = 179
Corresponding p-value < 0.005

Kolmogorov-Smirnov Test

Test Statistic = 0.0422
Corresponding p-value < 0.01

Data Summary

Number of Data Points = 3334
Min Data Value = 1
Max Data Value = 305
Sample Mean = 83.3
Sample Std Dev = 53.5

Histogram Summary

Histogram Range = 0.999 to 305
Number of Intervals = 40

Lampiran 5
ARENA (Km PEMAKAIAN)



Distribution Summary

Distribution: Weibull
Expression: $0.999 + WEIB(1.77e+003, 0.925)$
Square Error: 0.022958

Chi Square Test

Number of intervals = 40
Degrees of freedom = 37
Test Statistic = $3.33e+003$
Corresponding p-value < 0.005

Kolmogorov-Smirnov Test

Test Statistic = 0.0898
Corresponding p-value < 0.01

Data Summary

Number of Data Points = 3334
Min Data Value = 1
Max Data Value = $6e+003$
Sample Mean = $1.75e+003$
Sample Std Dev = $1.44e+003$

Histogram Summary

Histogram Range = 0.999 to $6e+003$
Number of Intervals = 40

Lampiran 6 Estimasi Parameter Model

Model Perpanjangan garansi

$$h(t, r, \lambda, \beta) := \lambda \cdot t^{\lambda-1} \cdot e^{-\lambda \cdot (\beta \cdot r)}$$

$$\frac{H}{\omega}(t, r, \lambda, \beta) := \frac{d}{dt} h(t, r, \lambda, \beta)$$

$$H(t, r, \lambda, \beta) \rightarrow \lambda \cdot t^{\lambda-1} \cdot \frac{\lambda-1}{t} \cdot e^{-\lambda \cdot \beta \cdot r}$$

$$\frac{S}{\omega}(t, r, \lambda, \beta) := e^{-t^{\lambda} \cdot e^{-\lambda \cdot (\beta \cdot r)}}$$

$$f(t, r, \lambda, \beta) := h(t, r, \lambda, \beta) \cdot S(t, r, \lambda, \beta)$$

$$f(t, r, \lambda, \beta) \rightarrow \lambda \cdot t^{\lambda-1} \cdot e^{-\lambda \cdot \beta \cdot r} \cdot e^{-t^{\lambda} \cdot e^{-\lambda \cdot \beta \cdot r}}$$

Data-data :

$$p := 34.5$$

$$q := 0.825$$

$$\frac{R}{\omega} :=$$



$$\frac{T}{\omega} :=$$



$$B_m := 300$$

$$KE := 720$$

$$LE := 20000$$

$$KG := 360$$

$$LG := 10000$$

$$KE2 := 860$$

$$r1 := \frac{LG}{KG}$$

$$r1 = 27.778$$

$$\frac{q}{\omega}(r) := \frac{p \cdot \left(\frac{r}{q}\right)^{p-1}}{q \left[1 + \left(\frac{r}{q}\right)^p\right]^2}$$

$$L1(\lambda, \beta) := \sum_{i=1}^{3333} \left[\log \left[\lambda \cdot (T_i)^{\lambda-1} \right] - \left[\lambda \cdot (\beta \cdot R_i) \right] - (T_i)^{\lambda} \cdot e^{-\lambda \cdot (\beta \cdot R_i)} \right]$$

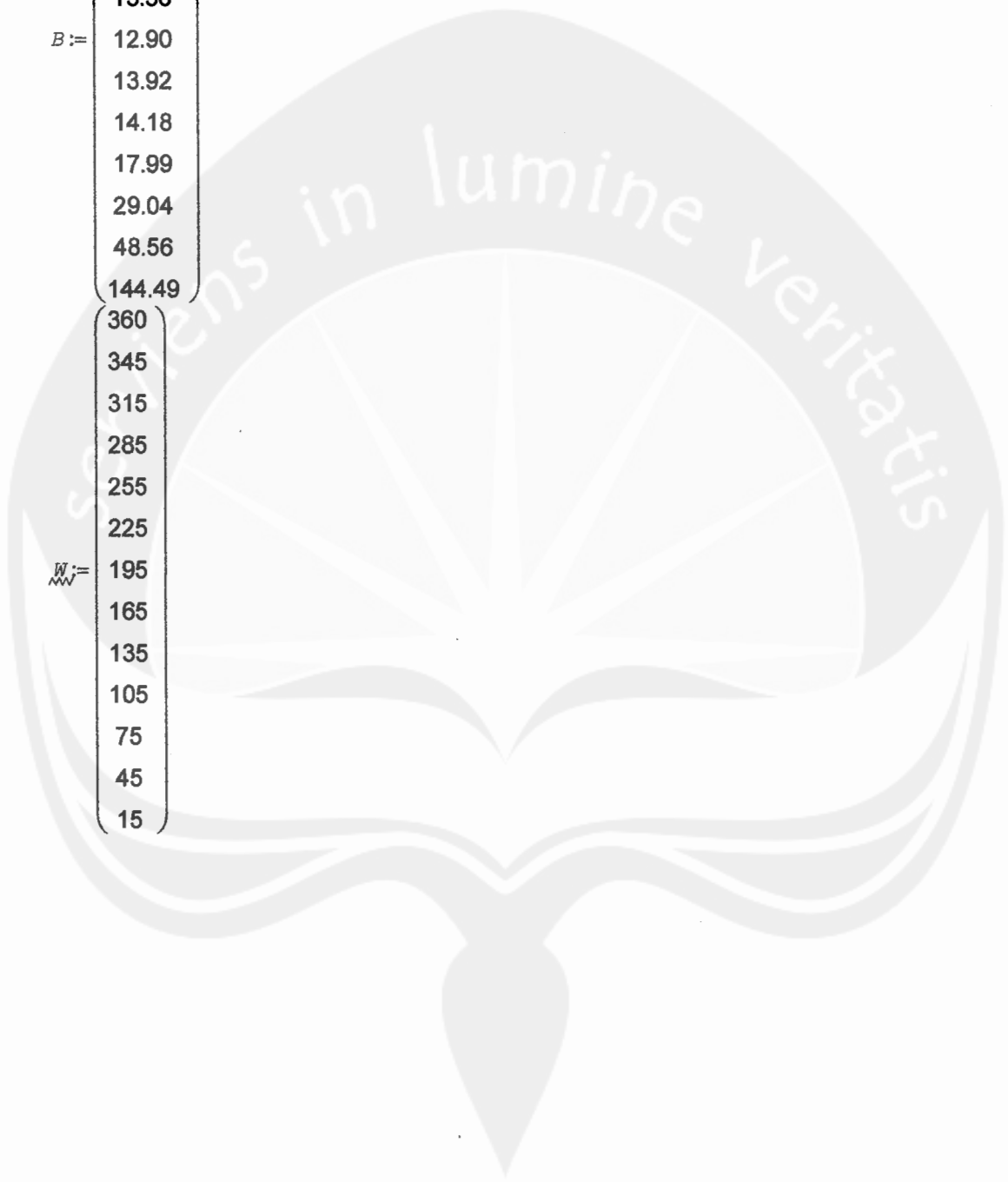
$$\frac{L1}{\omega}(\lambda, \beta) := \sum_{i=1}^{3333} \log(f(T_i, R_i, \lambda, \beta))$$

B :=

0.00
0.00
9.82
7.33
10.16
13.36
12.90
13.92
14.18
17.99
29.04
48.56
144.49

$\frac{W}{W} =$

360
345
315
285
255
225
195
165
135
105
75
45
15



	3751
	7855
	8112
	8411
	7985
	8011
M:=	8221
	9051
	8762
	7321
	7889
	7345
	4156
	0.00
	0.00
	2855.50
	1952.15
	2429.63
	2777.38
U:=	2290.84
	2073.42
	1689.86
	1581.27
	1699.79
	1631.14
	1133.89

$$A1(\lambda, \beta) := \log \left[\int_0^{B_0} e^{-\left(\frac{W_0}{r}\right)^\lambda \cdot e^{-\lambda \cdot (\beta \cdot r)}} \cdot g(r) \, dr + \int_{B_0}^{B_m} e^{-\left(\frac{U_0}{r}\right)^\lambda \cdot e^{-\lambda \cdot (\beta \cdot r)}} \cdot g(r) \, dr \right]$$

$$A2(\lambda, \beta) := \log \left[\int_0^{B_1} e^{-\left(\frac{W_1}{r}\right)^\lambda \cdot e^{-\lambda \cdot (\beta \cdot r)}} \cdot g(r) \, dr + \int_{B_1}^{B_m} e^{-\left(\frac{U_1}{r}\right)^\lambda \cdot e^{-\lambda \cdot (\beta \cdot r)}} \cdot g(r) \, dr \right]$$

$$\begin{aligned}
 A3(\lambda, \beta) &:= \log \left[\int_0^{B_2} e^{-\left(\frac{W_2}{r}\right)^\lambda \cdot e^{-\lambda \cdot (\beta \cdot r)}} \cdot g(r) \, dr + \int_{B_2}^{B_m} e^{-\left(\frac{U_2}{r}\right)^\lambda \cdot e^{-\lambda \cdot (\beta \cdot r)}} \cdot g(r) \, dr \right] \\
 A4(\lambda, \beta) &:= \log \left[\int_0^{B_3} e^{-\left(\frac{W_3}{r}\right)^\lambda \cdot e^{-\lambda \cdot (\beta \cdot r)}} \cdot g(r) \, dr + \int_{B_3}^{B_m} e^{-\left(\frac{U_3}{r}\right)^\lambda \cdot e^{-\lambda \cdot (\beta \cdot r)}} \cdot g(r) \, dr \right] \\
 A5(\lambda, \beta) &:= \log \left[\int_0^{B_4} e^{-\left(\frac{W_4}{r}\right)^\lambda \cdot e^{-\lambda \cdot (\beta \cdot r)}} \cdot g(r) \, dr + \int_{B_4}^{B_m} e^{-\left(\frac{U_4}{r}\right)^\lambda \cdot e^{-\lambda \cdot (\beta \cdot r)}} \cdot g(r) \, dr \right] \\
 A6(\lambda, \beta) &:= \log \left[\int_0^{B_5} e^{-\left(\frac{W_5}{r}\right)^\lambda \cdot e^{-\lambda \cdot (\beta \cdot r)}} \cdot g(r) \, dr + \int_{B_5}^{B_m} e^{-\left(\frac{U_5}{r}\right)^\lambda \cdot e^{-\lambda \cdot (\beta \cdot r)}} \cdot g(r) \, dr \right] \\
 A7(\lambda, \beta) &:= \log \left[\int_0^{B_6} e^{-\left(\frac{W_6}{r}\right)^\lambda \cdot e^{-\lambda \cdot (\beta \cdot r)}} \cdot g(r) \, dr + \int_{B_6}^{B_m} e^{-\left(\frac{U_6}{r}\right)^\lambda \cdot e^{-\lambda \cdot (\beta \cdot r)}} \cdot g(r) \, dr \right] \\
 A8(\lambda, \beta) &:= \log \left[\int_0^{B_7} e^{-\left(\frac{W_7}{r}\right)^\lambda \cdot e^{-\lambda \cdot (\beta \cdot r)}} \cdot g(r) \, dr + \int_{B_7}^{B_m} e^{-\left(\frac{U_7}{r}\right)^\lambda \cdot e^{-\lambda \cdot (\beta \cdot r)}} \cdot g(r) \, dr \right] \\
 A9(\lambda, \beta) &:= \log \left[\int_0^{B_8} e^{-\left(\frac{W_8}{r}\right)^\lambda \cdot e^{-\lambda \cdot (\beta \cdot r)}} \cdot g(r) \, dr + \int_{B_8}^{B_m} e^{-\left(\frac{U_8}{r}\right)^\lambda \cdot e^{-\lambda \cdot (\beta \cdot r)}} \cdot g(r) \, dr \right] \\
 A10(\lambda, \beta) &:= \log \left[\int_0^{B_9} e^{-\left(\frac{W_9}{r}\right)^\lambda \cdot e^{-\lambda \cdot (\beta \cdot r)}} \cdot g(r) \, dr + \int_{B_9}^{B_m} e^{-\left(\frac{U_9}{r}\right)^\lambda \cdot e^{-\lambda \cdot (\beta \cdot r)}} \cdot g(r) \, dr \right]
 \end{aligned}$$

$$A11(\lambda, \beta) := \log \left[\int_0^{B10} e^{-\left(\frac{W_{10}}{r}\right)^\lambda \cdot e^{-\lambda \cdot (\beta \cdot r)}} \cdot g(r) \, dr + \int_{B10}^{Bm} e^{-\left(\frac{U_{10}}{r}\right)^\lambda \cdot e^{-\lambda \cdot (\beta \cdot r)}} \cdot g(r) \, dr \right]$$

$$A12(\lambda, \beta) := \log \left[\int_0^{B11} e^{-\left(\frac{W_{11}}{r}\right)^\lambda \cdot e^{-\lambda \cdot (\beta \cdot r)}} \cdot g(r) \, dr + \int_{B11}^{Bm} e^{-\left(\frac{U_{11}}{r}\right)^\lambda \cdot e^{-\lambda \cdot (\beta \cdot r)}} \cdot g(r) \, dr \right]$$

$$A13(\lambda, \beta) := \log \left[\int_0^{B12} e^{-\left(\frac{W_{12}}{r}\right)^\lambda \cdot e^{-\lambda \cdot (\beta \cdot r)}} \cdot g(r) \, dr + \int_{B12}^{Bm} e^{-\left(\frac{U_{12}}{r}\right)^\lambda \cdot e^{-\lambda \cdot (\beta \cdot r)}} \cdot g(r) \, dr \right]$$

$$\text{func2}(\lambda, \beta) := A1(\lambda, \beta) \cdot M0 + A2(\lambda, \beta) \cdot M1 + A3(\lambda, \beta) \cdot M2 + A4(\lambda, \beta) \cdot M3 + A5(\lambda, \beta) \cdot M4 + A6(\lambda, \beta)$$

$$\text{func3}(\lambda, \beta) := A8(\lambda, \beta) \cdot M7 + A9(\lambda, \beta) \cdot M8 + A10(\lambda, \beta) \cdot M9 + A11(\lambda, \beta) \cdot M10 + A12(\lambda, \beta) \cdot M11 + A13$$

$$L(\lambda, \beta) := \text{func2}(\lambda, \beta) + \text{func3}(\lambda, \beta) + L1(\lambda, \beta)$$

$$\lambda := 0.1$$

$$\beta := 0.1$$

$$P := \text{Maximize}(L, \lambda, \beta)$$

$$\lambda := P0$$

$$\beta := P1$$

$$\lambda = 0.007923$$

$$\beta = 4.309$$

$$Da(\lambda, \beta) := \frac{d}{d\lambda} L(\lambda, \beta)$$

$$Da(\lambda, \beta) = -0.016$$

$$Db(\lambda, \beta) := \frac{d}{d\beta} L(\lambda, \beta)$$

$$Db(\lambda, \beta) = -0.016$$

$$Daa(\lambda, \beta) := \frac{d^2}{d\lambda^2} L(\lambda, \beta)$$

$$Daa(\lambda, \beta) = -2.817 \times 10^7$$

$$Dbb(\lambda, \beta) := \frac{d^2}{d\beta^2} L(\lambda, \beta)$$

$$Dbb(\lambda, \beta) = -19.809$$

$$Dab(\lambda, \beta) := \frac{d}{d\lambda} \frac{d}{d\beta} L(\lambda, \beta)$$

$$Dab(\lambda, \beta) = -9.215 \times 10^3$$

$$I := \begin{pmatrix} -Daa(\lambda, \beta) & -Dab(\lambda, \beta) \\ -Dab(\lambda, \beta) & -Dbb(\lambda, \beta) \end{pmatrix}$$

$$I^{-1} = \begin{pmatrix} 4.187 \times 10^{-8} & -1.948 \times 10^{-5} \\ -1.948 \times 10^{-5} & 0.06 \end{pmatrix}$$

$$BB := I^{-1}$$

$$S\beta := 0.9875 \cdot \sqrt{BB_{0,0}}$$

$$S\lambda := 0.9875 \cdot \sqrt{BB_{1,1}}$$

$$S\beta = 0.0002$$

$$S\lambda = 0.24096$$

$$WB\beta := \beta + S\beta \cdot 1.96$$

$$WK\beta := \beta - S\beta \cdot 1.96$$

$$WB\beta = 4.3098$$

$$WK\beta = 4.309$$

$$WB\lambda := \lambda + S\lambda \cdot 1.76$$

$$WK\lambda := \lambda - S\lambda \cdot 1.76$$

$$WB\lambda = 0.432$$

$$WK\lambda = -0.4162$$

Model Alternatif 1 :

Ekspektasi jumlah kegagalan selama periode *service contract* adalah :

$$C_m := 57808.54$$

$$r_1 = 27.778$$

$$E_Nr_0_KE_11 := \int_0^{r_1} \int_0^{KE} [\lambda \cdot t^{\lambda-1} \cdot e^{-\lambda \cdot (\beta \cdot r)}] dt \cdot g(r) dr + \int_{r_1}^{Bm} \int_0^{LE} [\lambda \cdot t^{\lambda-1} \cdot e^{-\lambda \cdot (\beta \cdot r)}] dt \cdot g(r) dr$$

$$E_Nr_0_KE_11 = 1.024211$$

$$Ongkos_gabungan_11 := C_m \cdot (E_Nr_0_KE_11)$$

$$Ongkos_gabungan_11 = 59208.136$$

$$E_Nr_0_KG := \int_0^{r_1} \int_0^{KG} [\lambda \cdot t^{\lambda-1} \cdot e^{-\lambda \cdot (\beta \cdot r)}] \cdot g(r) dt dr + \int_{r_1}^{Bm} \int_0^{LG} [\lambda \cdot t^{\lambda-1} \cdot e^{-\lambda \cdot (\beta \cdot r)}] \cdot g(r) dt dr$$

$$E_Nr_0_KG = 1.018601$$

$$Ongkos_garansi := C_m \cdot (E_Nr_0_KG)$$

$$Ongkos_garansi = 58883.852$$

$$Ongkos_Service_contract_11 := (E_Nr_0_KE_11 - E_Nr_0_KG) \cdot C_m$$

$$Ekspektasi_jumlah_kerusakan_11 := E_Nr_0_KE_11 - E_Nr_0_KG$$

$$Ekspektasi_jumlah_kerusakan_11 = 0.00561$$

Ongkos_Service_contract_11 = 324.285

Model Alternatif 2 :

Ekspektasi jumlah kegagalan selama periode service contract adalah :

$$E_Nr_0_KE_12 := \int_0^{r1} \int_0^{KE2} [\lambda \cdot t^{\lambda-1} \cdot e^{-\lambda \cdot (\beta \cdot r)}] \cdot g(r) dt dr + \int_{r1}^{Bm} \int_0^r [\lambda \cdot t^{\lambda-1} \cdot e^{-\lambda \cdot (\beta \cdot r)}] \cdot g(r) dt dr$$

$E_Nr_0_KE_12 = 1.025654$

$Ongkos_gabungan_12 := Cm \cdot (E_Nr_0_KE_12)$

$Ongkos_gabungan_12 = 59291.55$

$Ongkos_Service_contract_12 := (E_Nr_0_KE_12 - E_Nr_0_KG) \cdot Cm$

$Ekspektasi_jumlah_kerusakan_12 := E_Nr_0_KE_12 - E_Nr_0_KG$

$Ekspektasi_jumlah_kerusakan_12 = 0.007053$

$Ongkos_Service_contract_12 = 407.699$

Model Alternatif 3 :

Ekspektasi jumlah kegagalan selama periode service contract adalah :

$$E_Nr_0_KE_13 := \int_0^{r1} \int_0^{4000} [\lambda \cdot t^{\lambda-1} \cdot e^{-\lambda \cdot (\beta \cdot r)}] \cdot g(r) dt dr + \int_{r1}^{Bm} \int_0^r [\lambda \cdot t^{\lambda-1} \cdot e^{-\lambda \cdot (\beta \cdot r)}] \cdot g(r) dt dr$$

$E_Nr_0_KE_13 = 1.038222$

$Ongkos_gabungan_13 := Cm \cdot (E_Nr_0_KE_13)$

$Ongkos_gabungan_13 = 60018.089$

$Ongkos_Service_contract_13 := (E_Nr_0_KE_13 - E_Nr_0_KG) \cdot Cm$

$Ekspektasi_jumlah_kerusakan_13 := E_Nr_0_KE_13 - E_Nr_0_KG$

$Ekspektasi_jumlah_kerusakan_13 = 0.019621$

$Ongkos_Service_contract_13 = 1134.238$