

## LAMPIRAN

Lampiran 1. Pertambahan Bobot Badan Harian

Sapi Nomor	Kelompok	Bobot Awal	Bobot Akhir	PBBH
		kg		
9	I	384	416	1,28
12		396	420	0,96
22		372	396	0,96
23		376	404	1,12
Rata-rata		382	409	1,08
1	II	445	475	1,2
3		449	480	1,24
13		416	441	1,00
Rata-rata		436	465	1,14
4	III	462	497	1,4
6		479	506	1,08
19		488	519	1,28
Rata-rata		476	507	1,25

Sumber: Haryanti, 2009

Lampiran 2. Kebutuhan Nutrisi Sapi Potong

Berat Badan(kg)	PBBH(kg)	BK		TDN		PK(g)	Ca(g)	P(g)
		Kg	%*	Kg	**%			
250	Nol	4,4	1,8	2,0	45	337	9	9
	0,75	6,4	2,6	3,8	59	693	21	17
	1,00	6,6	2,6	4,3	58	753	23	18
	1,10	6,6	2,6	4,6	70	782	30	20
300	Nol	5,0	1,7	2,4	48	385	10	10
	0,75	7,4	2,5	4,3	58	753	23	18
	1,00	7,5	2,5	5,0	66	819	28	21
	1,10	7,6	2,5	5,3	70	847	30	22
350	Nol	5,7	1,6	2,6	46	432	12	12
	0,75	8,3	2,4	4,8	58	806	25	18
	1,00	8,5	2,4	5,6	66	874	30	21
	1,10	8,5	2,4	5,9	69	899	31	23
	1,20	8,5	2,4	6,2	73	923	32	24
	1,30	8,5	2,4	6,5	77	947	33	25
400	Nol	6,2	1,6	2,9	47	478	13	13
	0,75	9,1	2,3	5,4	59	875	26	21
	1,00	9,3	2,3	6,2	67	913	31	24
	1,10	9,4	2,4	6,6	70	942	32	25
	1,20	9,4	2,4	7,0	74	967	33	25
	1,30	9,4	2,4	7,2	77	988	33	26
450	Nol	6,8	1,5	3,2	47	528	14	14
	0,75	10,0	2,2	5,9	59	911	26	23
	1,00	10,2	2,2	6,8	67	952	29	26
	1,10	10,2	2,3	7,2	71	975	30	27
	1,20	10,2	2,3	7,6	75	998	31	28
	1,30	10	2,3	7,9	77	1018	32	29
500	1,20	11	2,2	8,2	75	1026	31	28
	1,30	10,9	2,3	8,6	79	1048	32	28

\*% dari berat bahan sebenarnya

\*\*% bahan kering

Sumber: Haryanti, 2009

BK : Bahan Kering

TDN : *Total Digestible Nutrient*

PK : Protein Kasar

Lampiran 3. Kandungan Nutrisi Bahan Pakan

No	Jenis Pakan	Kandungan Nutrisi(%)				
		BK	TDN	PK	Ca	P
1.	Dedak Padi	89,2	50	8,36	0,137	0,602
2.	Jerami Padi	87,5	43,2	4,15	0,413	0,292
3.	Konsentrat Kps	86	65	12	0,9	0,5
4.	Onggok	79,8	78,3	1,87	0,17	0,09
5.	Rumput Bengala	23,6	55,2	11,9	0,473	0,22
6.	Rumput Gajah	22,2	52,4	8,69	0,475	0,347
7.	Rumput Alam	24,4	56,2	8,2	0,366	0,23
8.	Susu	12,5	129	26,8	0,91	0,735
9.	Alang – alang	31	44,4	5,25	0,4	0,26
10.	Rumput teki	20	56,1	10,1	0,53	0,225
11.	Daun Pisang	23,3	73,5	16,6	0,567	0,18
12.	Kulit singkong	30,6	73,1	6,56	0,328	0,213
13.	Bekatul	88	69,9	12,8	0,079	1,23
14.	Ampas kecap	26,6	87,2	23,5	0,882	0,141
15.	Ketela	79,5	78,5	2,6	0,17	0,09
16.	Ampas nanas	20	68	3,4	0,26	0,09
17.	Tepung ikan	86	69	61,2	6,61	4,34
18.	Dedak halus padi	86	70	12,5	0,06	1,55
19.	Tetes	86	53	4,2	0,71	0,07
20.	Bungkil Kelapa	86	66	21,6	0,08	0,67
21.	Ampas Tahu	14,6	77,9	30,3	0,39	0,839
22.	Bungkil kedelai	86	78	45	0,2	0,74

Sumber : Haryanti, 2009

Lampiran 4. Kebutuhan zat pakan sapi potong

Bahan Pakan	Konsumsi(%)				
	BK	TDN	PK	Ca	P
Kelompok I >350–400 kg					
Kebutuhan	2,364	69,43	10,186	0,348	0,261
Kelompok II >400–450 kg					
Kebutuhan	2,284	72,189	9,776	0,311	0,267
Kelompok III >450–500 kg					
Kebutuhan	2,215	76,722	9,705	0,299	0,269

Sumber : Data kebutuhan pakan dihitung berdasarkan Kearl, 1982



Lampiran 5. Daftar harga bahan makanan sapi potong

<b>Bahan Makanan (j)</b>	<b>Harga (Rp)/kg</b>	<b>Harga (Rp)/gram</b>
Jerami	500	0,5
Ampas Tahu	1500	1,5
Ketela	800	0,8
Bekatul	2000	2
Ampas ketela	550	0,55
Tetes	6000	6
Sereal	3000	3
Dedak halus padi	1550	1,55
Kangkung kering	1200	1,2
511	6400	6,4
Jagung giling	3500	3,5
Pollard(wheat gandum)	4000	4
Garam sapi	1000	1
Bungkil Kelapa	2500	3
Bungkil kedelai	1050	1,05
Tepung ikan	2000	2
Konsentrat	2500	2,5

Sumber : Desa Sumberingin, Sanankulon, Blitar (14–16 Desember 2012)

Lampiran 6. Model Matematika Kelompok I bentuk diperluas

- Kasus I

Maksimumkan

$$Z' = -500x_1 - 800x_2 - 1500x_3 - 2000x_4$$

dengan kendala:

$$-87,5x_1 - 79,5x_2 - 14,6x_3 - 88x_4 + x_5 = -2,364$$

$$-43,2x_1 - 78,5x_2 - 77,9x_3 - 69,9x_4 + x_6 = -69,43$$

$$-4,15x_1 - 2,6x_2 - 30,3x_3 - 12,8x_4 + x_7 = -10,186$$

$$-0,413x_1 - 0,17x_2 - 0,39x_3 - 0,079x_4 + x_8 = -0,348$$

$$-0,292x_1 - 0,09x_2 - 0,839x_3 - 1,23x_4 + x_9 = -0,261$$

$$x_i \geq 0, i = 1, \dots, 9$$

- Kasus II

Maksimumkan

$$Z' = -500x_1 - 1550x_2 - 2500x_3 - 800x_4$$

dengan kendala:

$$-87,5x_1 - 86x_2 - 86x_3 - 79,5x_4 + x_5 = -2,364$$

$$-43,2x_1 - 70x_2 - 66x_3 - 78,5x_4 + x_6 = -69,43$$

$$-4,15x_1 - 12,5x_2 - 21,6x_3 - 2,6x_4 + x_7 = -10,186$$

$$-0,413x_1 - 0,06x_2 - 0,08x_3 - 0,17x_4 + x_8 = -0,348$$

$$-0,292x_1 - 1,55x_2 - 0,67x_3 - 0,09x_4 + x_9 = -0,261$$

$$x_i \geq 0, i = 1, \dots, 9$$

- Kasus III

Maksimumkan

$$Z' = -2000x_1 - 1550x_2 - 2500x_3 - 1050x_4$$

dengan kendala:

$$-86x_1 - 86x_2 - 86x_3 - 86x_4 + x_5 = -2,364$$

$$-69x_1 - 70x_2 - 66x_3 - 78x_4 + x_6 = -69,43$$

$$-61,2x_1 - 12,5x_2 - 21,6x_3 - 45x_4 + x_7 = -10,186$$

$$-6,61x_1 - 0,06x_2 - 0,08x_3 - 0,2x_4 + x_8 = -0,348$$

$$-4,34x_1 - 1,55x_2 - 0,67x_3 - 0,74x_4 + x_9 = -0,261$$

$$x_i \geq 0, i = 1, \dots, 9$$

## Lampiran 7. Model Matematika Kelompok II

### - Kasus I

Maksimumkan

$$Z' = -2000x_1 - 1550x_2 - 2500x_3 - 1050x_4$$

dengan kendala:

$$-86x_1 - 86x_2 - 86x_3 - 86x_4 + x_5 = -2,364$$

$$-69x_1 - 70x_2 - 66x_3 - 78x_4 + x_6 = -69,43$$

$$-61,2x_1 - 12,5x_2 - 21,6x_3 - 45x_4 + x_7 = -10,186$$

$$-6,61x_1 - 0,06x_2 - 0,08x_3 - 0,2x_4 + x_8 = -0,348$$

$$-4,34x_1 - 1,55x_2 - 0,67x_3 - 0,74x_4 + x_9 = -0,261$$

$$x_i \geq 0, i = 1, \dots, 9$$

### - Kasus II

Maksimumkan

$$Z' = -500x_1 - 1550x_2 - 2500x_3 - 800x_4$$

dengan kendala:

$$-87,5x_1 - 86x_2 - 86x_3 - 79,5x_4 + x_5 = -2,284$$

$$-43,2x_1 - 70x_2 - 66x_3 - 78,5x_4 + x_6 = -72,189$$

$$-4,15x_1 - 12,5x_2 - 21,6x_3 - 2,6x_4 + x_7 = -9,776$$

$$-0,413x_1 - 0,06x_2 - 0,08x_3 - 0,17x_4 + x_8 = -0,311$$

$$-0,292x_1 - 1,55x_2 - 0,67x_3 - 0,09x_4 + x_9 = -0,267$$

$$x_i \geq 0, i = 1, \dots, 9$$

### - Kasus III

Maksimumkan

$$Z' = -2000x_1 - 1550x_2 - 2500x_3 - 1050x_4$$

dengan kendala:

$$-86x_1 - 86x_2 - 86x_3 - 86x_4 + x_5 = -2,284$$

$$-69x_1 - 70x_2 - 66x_3 - 78x_4 + x_6 = -72,189$$

$$-61,2x_1 - 12,5x_2 - 21,6x_3 - 45x_4 + x_7 = -9,776$$

$$-6,61x_1 - 0,06x_2 - 0,08x_3 - 0,2x_4 + x_8 = -0,311$$

$$-4,34x_1 - 1,55x_2 - 0,67x_3 - 0,74x_4 + x_9 = -0,267$$

$$x_i \geq 0, i = 1, \dots, 9$$

### Lampiran 8. Model Matematika Kelompok III

- Kasus I

Maksimumkan

$$Z' = -500x_1 - 800x_2 - 1500x_3 - 2000x_4$$

dengan kendala:

$$-87,5x_1 - 79,5x_2 - 14,6x_3 - 88x_4 + x_5 = -2,215$$

$$-43,2x_1 - 78,5x_2 - 77,9x_3 - 69,9x_4 + x_6 = -76,722$$

$$-4,15x_1 - 2,6x_2 - 30,3x_3 - 12,8x_4 + x_7 = -9,705$$

$$-0,413x_1 - 0,17x_2 - 0,39x_3 - 0,079x_4 + x_8 = -0,299$$

$$-0,292x_1 - 0,09x_2 - 0,839x_3 - 1,23x_4 + x_9 = -0,268$$

$$x_i \geq 0, i = 1, \dots, 9$$

- Kasus II

Maksimumkan

$$Z' = -500x_1 - 1550x_2 - 2500x_3 - 800x_4$$

dengan kendala:

$$-87,5x_1 - 86x_2 - 86x_3 - 79,5x_4 + x_5 = -2,215$$

$$-43,2x_1 - 70x_2 - 66x_3 - 78,5x_4 + x_6 = -76,722$$

$$-4,15x_1 - 12,5x_2 - 21,6x_3 - 2,6x_4 + x_7 = -9,705$$

$$-0,413x_1 - 0,06x_2 - 0,08x_3 - 0,17x_4 + x_8 = -0,299$$

$$-0,292x_1 - 1,55x_2 - 0,67x_3 - 0,09x_4 + x_9 = -0,268$$

$$x_i \geq 0, i = 1, \dots, 9$$

- Kasus III

Maksimumkan

$$Z' = -2000x_1 - 700x_2 - 3000x_3 - 1050x_4$$

dengan kendala:

$$-86x_1 - 86x_2 - 86x_3 - 86x_4 + x_5 = -2,215$$

$$-69x_1 - 70x_2 - 66x_3 - 78x_4 + x_6 = -76,722$$

$$-61,2x_1 - 12,5x_2 - 21,6x_3 - 45x_4 + x_7 = -9,705$$

$$-6,61x_1 - 0,06x_2 - 0,08x_3 - 0,2x_4 + x_8 = -0,299$$

$$-4,34x_1 - 1,55x_2 - 0,67x_3 - 0,74x_4 + x_9 = -0,268$$

$$x_i \geq 0, i = 1, \dots, 9$$



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Lampiran 18. Nilai variabel dan Z kelompok I kasus I dengan LINGO

MODEL:

$MIN = 500*A + 800*B + 1500*C + 2000*D;$   
 $87.5*A + 79.5*B + 14.6*C + 88*D \geq 2.364;$   
 $43.2*A + 78.5*B + 77.9*C + 69.9*D \geq 69.43;$   
 $4.15*A + 2.6*B + 30.3*C + 12.8*D \geq 10.186;$   
 $0.413*A + 0.17*B + 0.39*C + 0.079*D \geq 0.348;$   
 $0.292*A + 0.09*B + 0.839*C + 1.23*D \geq 0.261;$   
 END

Hasil:

Global optimal solution found.

Objective value: 895.8032

Infeasibilities: 0.000000

Total solver iterations: 3

Variable	Value	Reduced Cost
A	1.329282	0.000000
B	0.000000	21.01859
C	0.1541083	0.000000
D	0.000000	1031.387

Row	Slack or Surplus	Dual Price
1	895.8032	-1.000000
2	116.1981	0.000000
3	0.000000	-9.054709
4	0.000000	-26.22568
5	0.2610955	0.000000
6	0.2564471	0.000000



Lampiran 19. Nilai variabel dan Z kelompok I kasus II dengan

LINGO

MODEL:

$$\text{MIN} = 500*A + 1550*B + 2500*C + 800*D;$$

$$87.5*A + 86*B + 86*C + 79.5*D \geq 2.364;$$

$$43.2*A + 70*B + 66*C + 78.5*D \geq 69.43;$$

$$4.15*A + 12.5*B + 21.6*C + 2.6*D \geq 10.186;$$

$$0.413*A + 0.06*B + 0.08*C + 0.17*D \geq 0.348;$$

$$0.292*A + 1.55*B + 0.67*C + 0.09*D \geq 0.261;$$

END

Hasil:

Global optimal solution found.

Objective value: 1203.631

Infeasibilities: 0.000000

Total solver iterations: 3

Variable	Value	Reduced Cost
A	1.255138	0.000000
B	0.000000	82.73566
C	0.2304249	0.000000
D	0.000000	453.5868

Row	Slack or Surplus	Dual Price
1	1203.631	-1.000000
2	127.2771	0.000000
3	0.000000	-0.6447013
4	0.000000	-113.7708
5	0.1888059	0.000000
6	0.2598849	0.000000

Lampiran 20. Nilai variabel dan Z kelompok I kasus III dengan

LINGO

MODEL:

$$\text{MIN} = 2000*A + 1550*B + 2500*C + 1050*D;$$

$$86*A + 86*B + 86*C + 86*D \geq 2.364;$$

$$69*A + 70*B + 66*C + 78*D \geq 69.43;$$

$$61.2*A + 12.5*B + 21.6*C + 45*D \geq 10.186;$$

$$6.61*A + 0.06*B + 0.08*C + 0.2*D \geq 0.348;$$

$$4.34*A + 1.55*B + 0.67*C + 0.74*D \geq 0.261;$$

END

Hasil:

Global optimal solution found.

Objective value: 962.9366

Infeasibilities: 0.000000

Total solver iterations: 2

Variable	Value	Reduced Cost
A	0.2642194E-01	0.000000
B	0.000000	627.5878
C	0.000000	1626.396
D	0.8667550	0.000000

Row	Slack or Surplus	Dual Price
1	962.9366	-1.000000
2	74.44921	0.000000
3	0.000000	-13.03460
4	30.43500	0.000000
5	0.000000	-166.5072
6	0.4950699	0.000000

Lampiran 21. Nilai variabel dan Z kelompok II kasus I dengan

LINGO

MODEL:

$$\text{MIN} = 500*A + 800*B + 1500*C + 2000*D;$$

$$87.5*A + 79.5*B + 14.6*C + 88*D \geq 2.284;$$

$$43.2*A + 78.5*B + 77.9*C + 69.9*D \geq 72.189;$$

$$4.15*A + 2.6*B + 30.3*C + 12.8*D \geq 9.776;$$

$$0.413*A + 0.17*B + 0.39*C + 0.079*D \geq 0.311;$$

$$0.292*A + 0.09*B + 0.839*C + 1.23*D \geq 0.267;$$

END

Hasil:

Global optimal solution found.

Objective value: 910.0326

Infeasibilities: 0.000000

Total solver iterations: 3

Variable	Value	Reduced Cost
A	1.446497	0.000000
B	0.000000	21.01859
C	0.1245226	0.000000
D	0.000000	1031.387

Row	Slack or Surplus	Dual Price
1	910.0326	-1.000000
2	126.1026	0.000000
3	0.000000	-9.054709
4	0.000000	-26.22568
5	0.3349672	0.000000
6	0.2598517	0.000000

Lampiran 22. Nilai variabel dan Z kelompok II kasus II dengan

LINGO

MODEL:

$$\text{MIN} = 500*A + 1550*B + 2500*C + 800*D;$$

$$87.5*A + 86*B + 86*C + 79.5*D \geq 2.284;$$

$$43.2*A + 70*B + 66*C + 78.5*D \geq 72.189;$$

$$4.15*A + 12.5*B + 21.6*C + 2.6*D \geq 9.776;$$

$$0.413*A + 0.06*B + 0.08*C + 0.17*D \geq 0.311;$$

$$0.292*A + 1.55*B + 0.67*C + 0.09*D \geq 0.267;$$

END

Hasil:

Global optimal solution found.

Objective value: 1158.764

Infeasibilities: 0.000000

Total solver iterations: 3

Variable	Value	Reduced Cost
A	1.386588	0.000000
B	0.000000	82.73566
C	0.1861880	0.000000
D	0.000000	453.5868

Row	Slack or Surplus	Dual Price
1	1158.764	-1.000000
2	135.0546	0.000000
3	0.000000	-0.6447013
4	0.000000	-113.7708
5	0.2765558	0.000000
6	0.2626296	0.000000

Lampiran 23. Nilai variabel dan Z kelompok II kasus III dengan

LINGO

MODEL:

$$\text{MIN} = 2000*A + 1550*B + 2500*C + 1050*D;$$

$$86*A + 86*B + 86*C + 86*D \geq 2.284;$$

$$69*A + 70*B + 66*C + 78*D \geq 72.189;$$

$$61.2*A + 12.5*B + 21.6*C + 45*D \geq 9.776;$$

$$6.61*A + 0.06*B + 0.08*C + 0.2*D \geq 0.311;$$

$$4.34*A + 1.55*B + 0.67*C + 0.74*D \geq 0.267;$$

END

Hasil:

Global optimal solution found.

Objective value: 992.7383

Infeasibilities: 0.000000

Total solver iterations: 2

Variable	Value	Reduced Cost
A	0.1957073E-01	0.000000
B	0.000000	627.5878
C	0.000000	1626.396
D	0.9081874	0.000000

Row	Slack or Surplus	Dual Price
1	992.7383	-1.000000
2	77.50320	0.000000
3	0.000000	-13.03460
4	32.29016	0.000000
5	0.000000	-166.5072
6	0.4899957	0.000000

Lampiran 24. Nilai variabel dan Z kelompok III kasus I dengan

LINGO

MODEL:

```
MIN = 500*A +800*B+1500*C+2000*D;  
87.5*A+79.5*B+14.6*C+88*D >= 2.215;  
43.2*A+78.5*B+77.9*C+69.9*D>= 76.722;  
4.15*A+2.6*B+30.3*C+12.8*D>= 9.705;  
0.413*A+0.17*B+0.39*C+0.079*D>= 0.299;  
0.292*A+0.09*B+0.839*C+1.23*D>= 0.268;  
END
```

Hasil:

Global optimal solution found.

Objective value: 949.2156

Infeasibilities: 0.000000

Total solver iterations: 3

Variable	Value	Reduced Cost
A	1.591455	0.000000
B	0.000000	21.01859
C	0.1023255	0.000000
D	0.000000	1031.387

Row	Slack or Surplus	Dual Price
1	949.2156	-1.000000
2	138.5312	0.000000
3	0.000000	-9.054709
4	0.000000	-26.22568
5	0.3981777	0.000000
6	0.2825559	0.000000

Lampiran 25. Nilai variabel dan Z kelompok III kasus II dengan

LINGO

MODEL:

$$\text{MIN} = 500*A + 1550*B + 2500*C + 800*D;$$

$$87.5*A + 86*B + 86*C + 79.5*D \geq 2.215;$$

$$43.2*A + 70*B + 66*C + 78.5*D \geq 76.722;$$

$$4.15*A + 12.5*B + 21.6*C + 2.6*D \geq 9.705;$$

$$0.413*A + 0.06*B + 0.08*C + 0.17*D \geq 0.299;$$

$$0.292*A + 1.55*B + 0.67*C + 0.09*D \geq 0.268;$$

END

Hasil:

Global optimal solution found.

Objective value: 1153.609

Infeasibilities: 0.000000

Total solver iterations: 3

Variable	Value	Reduced Cost
A	1.542224	0.000000
B	0.000000	82.73566
C	0.1529985	0.000000
D	0.000000	453.5868

Row	Slack or Surplus	Dual Price
1	1153.609	-1.000000
2	145.8875	0.000000
3	0.000000	-0.6447013
4	0.000000	-113.7708
5	0.3501786	0.000000
6	0.2848386	0.000000

Lampiran 26. Nilai variabel dan Z kelompok III kasus III dengan

LINGO

MODEL:

$$\text{MIN} = 2000*A + 1550*B + 2500*C + 1050*D;$$

$$86*A + 86*B + 86*C + 86*D \geq 2.215;$$

$$69*A + 70*B + 66*C + 78*D \geq 76.722;$$

$$61.2*A + 12.5*B + 21.6*C + 45*D \geq 9.705;$$

$$6.61*A + 0.06*B + 0.08*C + 0.2*D \geq 0.299;$$

$$4.34*A + 1.55*B + 0.67*C + 0.74*D \geq 0.268;$$

END

Hasil:

Global optimal solution found.

Objective value: 1049.826

Infeasibilities: 0.000000

Total solver iterations: 2

Variable	Value	Reduced Cost
A	0.1589860E-01	0.000000
B	0.000000	627.5878
C	0.000000	1626.396
D	0.9695512	0.000000

Row	Slack or Surplus	Dual Price
1	1049.826	-1.000000
2	82.53369	0.000000
3	0.000000	-13.03460
4	34.89780	0.000000
5	0.000000	-166.5072
6	0.5184678	0.000000



Lmpiran 27. Contoh perhitungan x percobaan awal  
Maksimumkan

$$Z' = -500x_1 - 800x_2 - 1500x_3 - 2000x_4$$

dengan kendala:

$$-87,5x_1 - 79,5x_2 - 14,6x_3 - 88x_4 + x_5 = -2,364$$

$$-43,2x_1 - 78,5x_2 - 77,9x_3 - 69,9x_4 + x_6 = -69,43$$

$$-4,15x_1 - 2,6x_2 - 30,3x_3 - 12,8x_4 + x_7 = -10,186$$

$$-0,413x_1 - 0,17x_2 - 0,39x_3 - 0,079x_4 + x_8 = -0,348$$

$$-0,292x_1 - 0,09x_2 - 0,839x_3 - 1,23x_4 + x_9 = -0,261$$

$$x_i \geq 0, i = 1, \dots, 9$$

Pada fungsi kendala pertama:

$$-87,5x_1 - 79,5x_2 - 14,6x_3 - 88x_4 + x_5 = -2,364$$

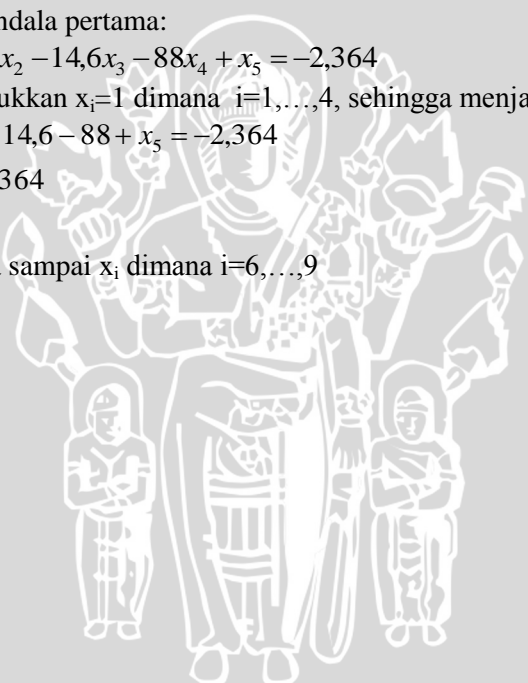
dengan memasukkan  $x_i = 1$  dimana  $i = 1, \dots, 4$ , sehingga menjadi

$$-87,5 - 79,5 - 14,6 - 88 + x_5 = -2,364$$

$$x_5 = 269,6 - 2,364$$

$$x_5 = 267,236$$

Dan seterusnya sampai  $x_i$  dimana  $i = 6, \dots, 9$



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