Module/submodel: Linear Programming
Problem title: LPP-Example1
Objective: Maximize

Problem and Results ----------

X1	Basic	0
X2	Basic	14.2857
slack 1	NONBasic	0
slack 2	NONBasic	0
Optimal Value (Z)		171.4286

Ranging ----------

Variable	Value	Reduced Cost	Original Value	Lower Bound	Upper Bound
X1	0	0	10	8.5714	10.2857
X2	14.2857	0	12	11.6667	14

Constraint	Dual Value	Slack/ Surplus	Original Value	Lower Bound	Upper Bound
Constraint 1	.2857	0	100	83.3333	100
Constraint 2	.7143	0	200	200	240

Original Problem w/answers ----------

	X1	X2		RHS
Maximize	10	12		
Constraint 1	5	7	<=	100
Constraint 2	12	14	<=	200
Solution	**0**	**14.2857**		**171.4286**

Iterations ----------

Iteration 1

Cj-->		10	12	0	0
Basic	Quantity	X1	X2	slack 1	slack 2
slack 1	100	5	7	1	0
slack 2	200	12	14	0	1
zj	0	0	0	0	0
cj-zj		10	12	0	0

Iteration 2

Cj-->		10	12	0	0
Basic	Quantity	X1	X2	slack 1	slack 2
X2	14.2857	0.7143	1	0.1429	0
slack 2	0	2.0	0	-2	1
zj	171.4286	8.5714	12	1.7143	0
cj-zj		1.4286	0	-1.7143	0

Iteration 3

Cj-->		10	12	0	0
Basic	Quantity	X1	X2	slack 1	slack 2
X2	14.2857	0	1	0.8571	-0.3571
X1	0	1	0	-1	0.5

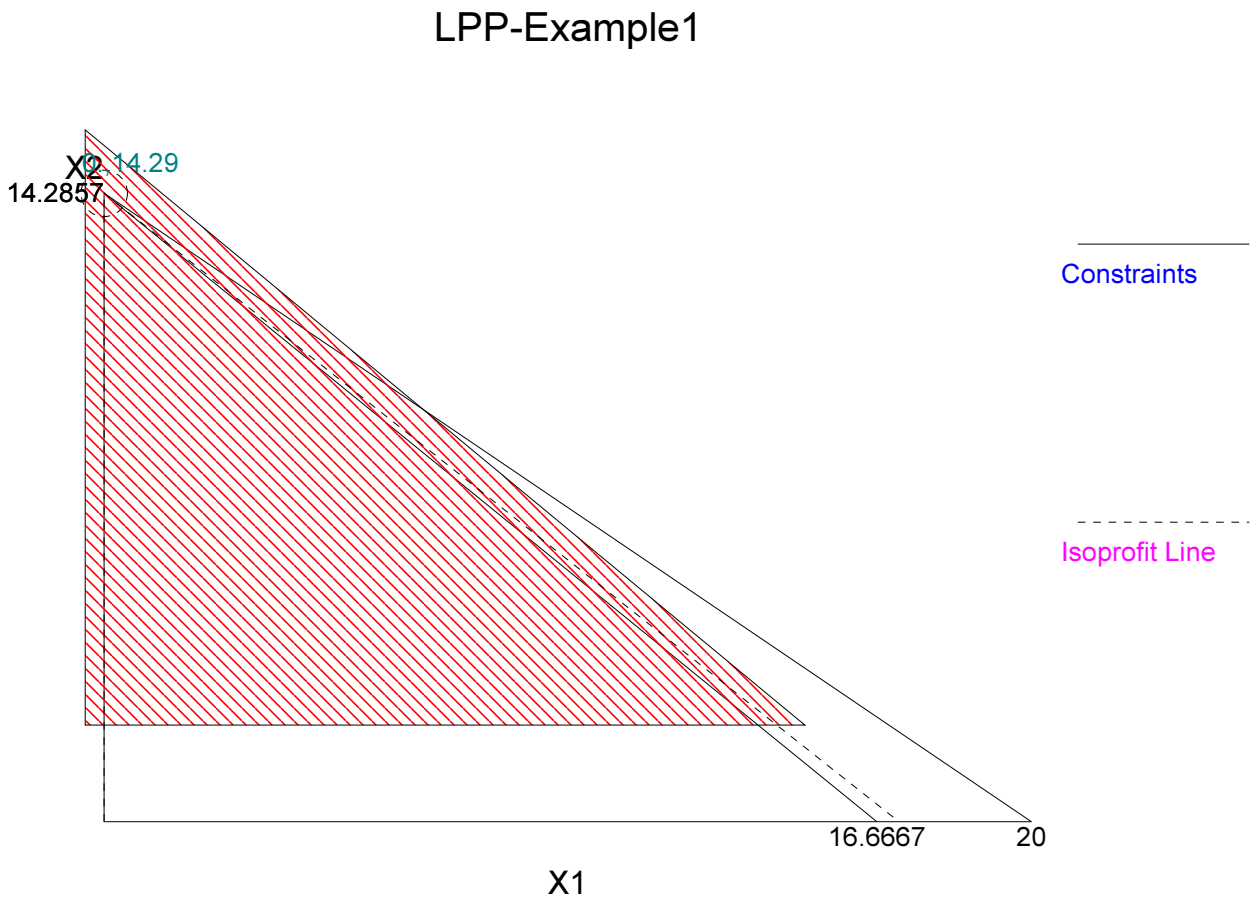
zj	171.4286	10	12	.2857	.7143
cj-zj		0	0	-0.2857	-0.7143

Dual ----------

	y1	y2		
Minimize	100	200		
X1	5	12	>=	10
X2	7	14	>=	12

Intercepts and Intersections ----------

	X1	X2	Profit
Point 1	0	0	0
Point 2	0	14.2857	171.4286
Point 3	16.6667	0	166.6667
Point 4	0	14.2857	171.4286



Module/submodel: Linear Programming
Problem title: LPP-Example2
Objective: Maximize

Problem and Results ----------

X1	Basic	5.824
X2	Basic	3.427
slack 1	NONBasic	0
slack 2	NONBasic	0
Optimal Value (Z)		288.1648

Ranging ----------

Variable	Value	Reduced Cost	Original Value	Lower Bound	Upper Bound
X1	5.824	0	23	14.6739	28.4211
X2	3.427	0	45	36.4167	70.5333

Constraint	Dual Value	Slack/ Surplus	Original Value	Lower Bound	Upper Bound
Constraint 1	1.4345	0	135	101.1957	196
Constraint 2	.3858	0	245	168.75	326.8421

Original Problem w/answers ----------

	X1	X2		RHS
Maximize	23	45		
Constraint 1	12	19	<=	135
Constraint 2	15	46	<=	245
Solution	**5.824**	**3.427**		**288.1648**

Iterations ----------

Iteration 1

Cj-->		23	45	0	0
Basic	Quantity	X1	X2	slack 1	slack 2
slack 1	135	12	19	1	0
slack 2	245	15	46	0	1
zj	0	0	0	0	0
cj-zj		23	45	0	0

Iteration 2

Cj-->		23	45	0	0
Basic	Quantity	X1	X2	slack 1	slack 2
slack 1	33.8043	5.8043	0	1	-0.413
X2	5.3261	0.3261	1	0	0.0217
zj	239.6739	14.6739	45	0	.9783
cj-zj		8.3261	0	0	-0.9783

Iteration 3

Cj-->		23	45	0	0
Basic	Quantity	X1	X2	slack 1	slack 2
X1	5.824	1	0	0.1723	-0.0712
X2	3.427	0	1	-0.0562	0.0449

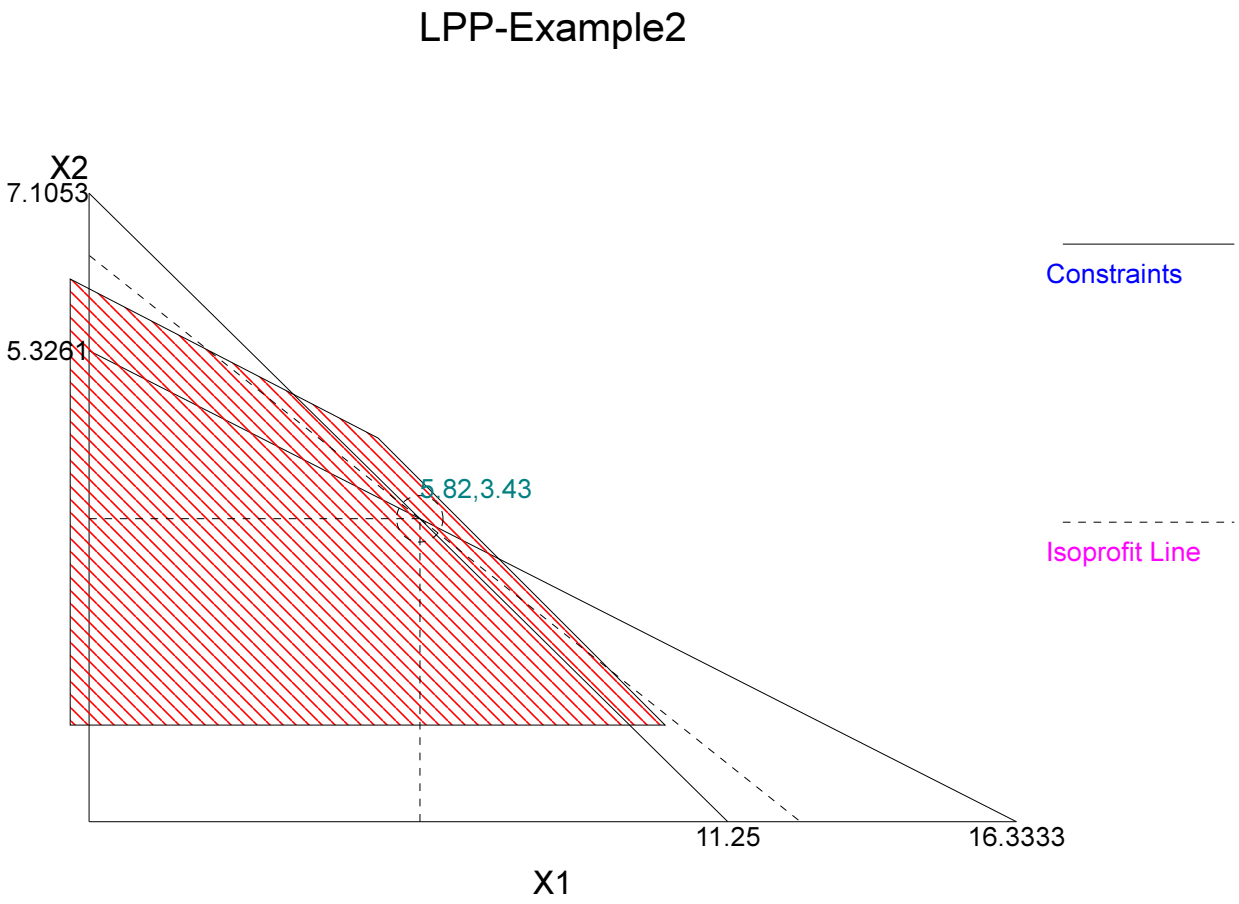
zj	288.1648	23	45	1.4345	.3858
cj-zj		0	0	-1.4345	-0.3858

Dual ----------

	y1	y2		
Minimize	135	245		
X1	12	15	>=	23
X2	19	46	>=	45

Intercepts and Intersections ----------

	X1	X2	Profit
Point 1	0	0	0
Point 2	11.25	0	258.75
Point 3	0	5.3261	239.6739
Point 4	5.824	3.427	288.1648



Module/submodel: Linear Programming
Problem title: LPP-Example3
Objective: Maximize

Problem and Results ----------

X1	NONBasic	0
X2	Basic	8.2105
X3	Basic	.6316
slack 1	NONBasic	0
slack 2	NONBasic	0
slack 3	Basic	363.1579
Optimal Value (Z)		107.3684

Ranging ----------

Variable	Value	Reduced Cost	Original Value	Lower Bound	Upper Bound
X1	0	.5263	10	-Infinity	10.5263
X2	8.2105	0	12	11.2	13.0345
X3	.6316	0	14	12.8889	15

Constraint	Dual Value	Slack/ Surplus	Original Value	Lower Bound	Upper Bound
Constraint 1	.2105	0	240	208.8	243
Constraint 2	.1579	0	360	355.5555	413.7931
Constraint 3	0	363.1579	480	116.8421	Infinity

Original Problem w/answers ----------

	X1	X2	X3		RHS
Maximize	10	12	14		
Constraint 1	23	27	29	<=	240
Constraint 2	36	40	50	<=	360
Constraint 3	50	10	55	<=	480
Solution	**0**	**8.2105**	**.6316**		**107.3684**

Iterations ----------

Iteration 1

Cj-->		10	12	14	0	0	0
Basic	Quantity	X1	X2	X3	slack 1	slack 2	slack 3
slack 1	240	23	27	29	1	0	0
slack 2	360	36	40	50	0	1	0
slack 3	480	50	10	55	0	0	1
zj	0	0	0	0	0	0	0
cj-zj		10	12	14	0	0	0

Iteration 2

Cj-->		10	12	14	0	0	0
Basic	Quantity	X1	X2	X3	slack 1	slack 2	slack 3
slack 1	31.2	2.12	3.8	0	1	-0.58	0
X3	7.2	0.72	0.8	1	0	0.02	0
slack 3	84.0	10.4	-34	0	0	-1.1	1
zj	100.8	10.08	11.2	14	0	.28	0
cj-zj		-0.08	0.8	0	0	-0.28	0

Iteration 3

Cj-->		10	12	14	0	0	0
Basic	Quantity	X1	X2	X3	slack 1	slack 2	slack 3
X2	8.2105	0.5579	1	0	0.2632	-0.1526	0
X3	0.6316	0.2737	0	1	-0.2105	0.1421	0
slack 3	363.1579	29.3684	0	0	8.9474	-6.2895	1
zj	107.3684	10.5263	12	14	.2105	.1579	0
cj-zj		-0.5263	0	0	-0.2105	-0.1579	0

Dual ----------

	y1	y2	y3		
Minimize	240	360	480		
X1	23	36	50	>=	10
X2	27	40	10	>=	12
X3	29	50	55	>=	14

Module/submodel: Linear Programming
Problem title: LPP-Example4
Objective: Maximize

Problem and Results ----------

X1	Basic	20
X2	NONBasic	0
X3	NONBasic	0
slack 1	Basic	200
slack 2	Basic	100
slack 3	NONBasic	0
Optimal Value (Z)		2000

Ranging ----------

Variable	Value	Reduced Cost	Original Value	Lower Bound	Upper Bound
X1	20	0	100	93.75	Infinity
X2	0	10	150	-Infinity	160
X3	0	30	200	-Infinity	230

Constraint	Dual Value	Slack/ Surplus	Original Value	Lower Bound	Upper Bound
Constraint 1	0	200	400	200	Infinity
Constraint 2	0	100	500	400	Infinity
Constraint 3	3.3333	0	600	-.0003	750

Original Problem w/answers ----------

	X1	X2	X3		RHS
Maximize	100	150	200		
Constraint 1	10	18	39	<=	400
Constraint 2	20	38	59	<=	500
Constraint 3	30	48	69	<=	600
Solution	**20**	**0**	**0**		**2000**

Iterations ----------

Iteration 1

Cj-->		100	150	200	0	0	0
Basic	Quantity	X1	X2	X3	slack 1	slack 2	slack 3
slack 1	400	10	18	39	1	0	0
slack 2	500	20	38	59	0	1	0
slack 3	600	30	48	69	0	0	1
zj	0	0	0	0	0	0	0
cj-zj		100	150	200	0	0	0

Iteration 2

Cj-->		100	150	200	0	0	0
Basic	Quantity	X1	X2	X3	slack 1	slack 2	slack 3
slack 1	69.4915	-3.2203	-7.1186	0	1	-0.661	0
X3	8.4746	0.339	0.6441	1	0	0.0169	0
slack 3	15.2542	6.6102	3.5593	0	0	-1.1695	1
zj	1,694.9153	67.7966	128.8136	200	0	3.3898	0
cj-zj		32.2034	21.1864	0	0	-3.3898	0

Iteration 3

Cj-->		100	150	200	0	0	0
Basic	Quantity	X1	X2	X3	slack 1	slack 2	slack 3
slack 1	76.9231	0	-5.3846	0	1	-1.2308	0.4872
X3	7.6923	0	0.4615	1	0	0.0769	-0.0513
X1	2.3077	1	0.5385	0	0	-0.1769	0.1513
zj	1,769.2308	100	146.1538	200	0	-2.3077	4.8718
cj-zj		0	3.8462	0	0	2.3077	-4.8718

Iteration 4

Cj-->		100	150	200	0	0	0
Basic	Quantity	X1	X2	X3	slack 1	slack 2	slack 3
slack 1	100.0	10.0	0	0	1	-3.0	2.0
X3	5.7143	-0.8571	0	1	0	0.2286	-0.181
X2	4.2857	1.8571	1	0	0	-0.3286	0.281
zj	1,785.7143	107.1429	150	200	0	-3.5714	5.9524
cj-zj		-7.1429	0	0	0	3.5714	-5.9524

Iteration 5

Cj-->		100	150	200	0	0	0
Basic	Quantity	X1	X2	X3	slack 1	slack 2	slack 3
slack 1	175.0	-1.25	0	13.125	1	0	-0.375
slack 2	25.0	-3.75	0	4.375	0	1	-0.7917
X2	12.5	0.625	1	1.4375	0	0	0.0208
zj	1,875.0	93.75	150	215.625	0	0	3.125
cj-zj		6.25	0	-15.625	0	0	-3.125

Iteration 6

Cj-->		100	150	200	0	0	0
Basic	Quantity	X1	X2	X3	slack 1	slack 2	slack 3
slack 1	200.0	0	2.0	16.0	1	0	-0.3333
slack 2	100.0	0	6.0	13.0	0	1	-0.6667
X1	20.0	1	1.6	2.3	0	0	0.0333
zj	2,000.0	100	160	230	0	0	3.3333
cj-zj		0	-10.0	-30.0	0	0	-3.3333

Dual ----------

	y1	y2	y3		
Minimize	400	500	600		
X1	10	20	30	>=	100
X2	18	38	48	>=	150
X3	39	59	69	>=	200

Module/submodel: Linear Programming
Problem title: LPP-Example5
Objective: Minimize

Problem and Results ----------

X1	NONBasic	0
X2	Basic	12.7273
surplus 1	NONBasic	0
surplus 2	Basic	730
Optimal Value (Z)		152.7273

Ranging ----------

Variable	Value	Reduced Cost	Original Value	Lower Bound	Upper Bound
X1	0	.8182	9	8.1818	Infinity
X2	12.7273	0	12	0	13.2

Constraint	Dual Value	Slack/ Surplus	Original Value	Lower Bound	Upper Bound
Constraint 1	-.5455	0	280	97.5	Infinity
Constraint 2	0	730	390	-Infinity	1120

Original Problem w/answers ----------

	X1	X2		RHS
Minimize	9	12		
Constraint 1	15	22	>=	280
Constraint 2	45	88	>=	390
Solution	**0**	**12.7273**		**152.7273**

Iterations ----------

Iteration 1

Cj-->		9	12	0	0	0	0
Basic	Quantity	X1	X2	artfcl 1	surplus 1	artfcl 2	surplus 2
artfcl 1	280	15	22	1	-1	0	0
artfcl 2	390	45	88	0	0	1	-1
zj	670	-60	-110	1	1	1	1
cj-zj		60	110	0	-1	0	-1

Iteration 2

Cj-->		9	12	0	0	0	0
Basic	Quantity	X1	X2	artfcl 1	surplus 1	artfcl 2	surplus 2
artfcl 1	182.5	3.75	0	1	-1	-0.25	0.25
X2	4.4318	0.5114	1	0	0	0.0114	-0.0114
zj	182.5	-3.75	0	1	1	2.25	-.25
cj-zj		3.75	0	0	-1	-1.25	0.25

Iteration 3

Cj-->		9	12	0	0	0	0
Basic	Quantity	X1	X2	artfcl 1	surplus 1	artfcl 2	surplus 2
artfcl 1	150	0	-7.3333	1	-1	-0.3333	0.3333
X1	8.6667	1	1.9556	0	0	0.0222	-0.0222

zj	150.0	0	7.3333	1	1	2.3333	-.3333
cj-zj		0	-7.3333	0	-1	-1.3333	0.3333

Iteration 4

Cj-->		9	12	0	0	0	0
Basic	Quantity	X1	X2	artfcl 1	surplus 1	artfcl 2	surplus 2
surplus 2	450	0	-22	3	-3	-1	1
X1	18.6667	1	1.4667	0.0667	-0.0667	0	0
zj	0.0	0	0	2	0	2	0
cj-zj		0	0	-1.0	0	-1.0	0

Iteration 5

Cj-->		9	12	0	0	0	0
Basic	Quantity	X1	X2	artfcl 1	surplus 1	artfcl 2	surplus 2
surplus 2	450	0	-22	3	-3	-1	1
X1	18.6667	1	1.4667	0.0667	-0.0667	0	0
zj	168.0	9	10.8	-.6	.6	0	0
cj-zj		0	1.2	0.6	-0.6	0	0

Iteration 6

Cj-->		9	12	0	0	0	0
Basic	Quantity	X1	X2	artfcl 1	surplus 1	artfcl 2	surplus 2
surplus 2	730.0	15.0	0	4.0	-4.0	-1	1
X2	12.7273	0.6818	1	0.0455	-0.0455	0	0
zj	152.7273	9.8182	12	-.5455	.5455	0	0
cj-zj		-0.8182	0	0.5455	-0.5455	0	0

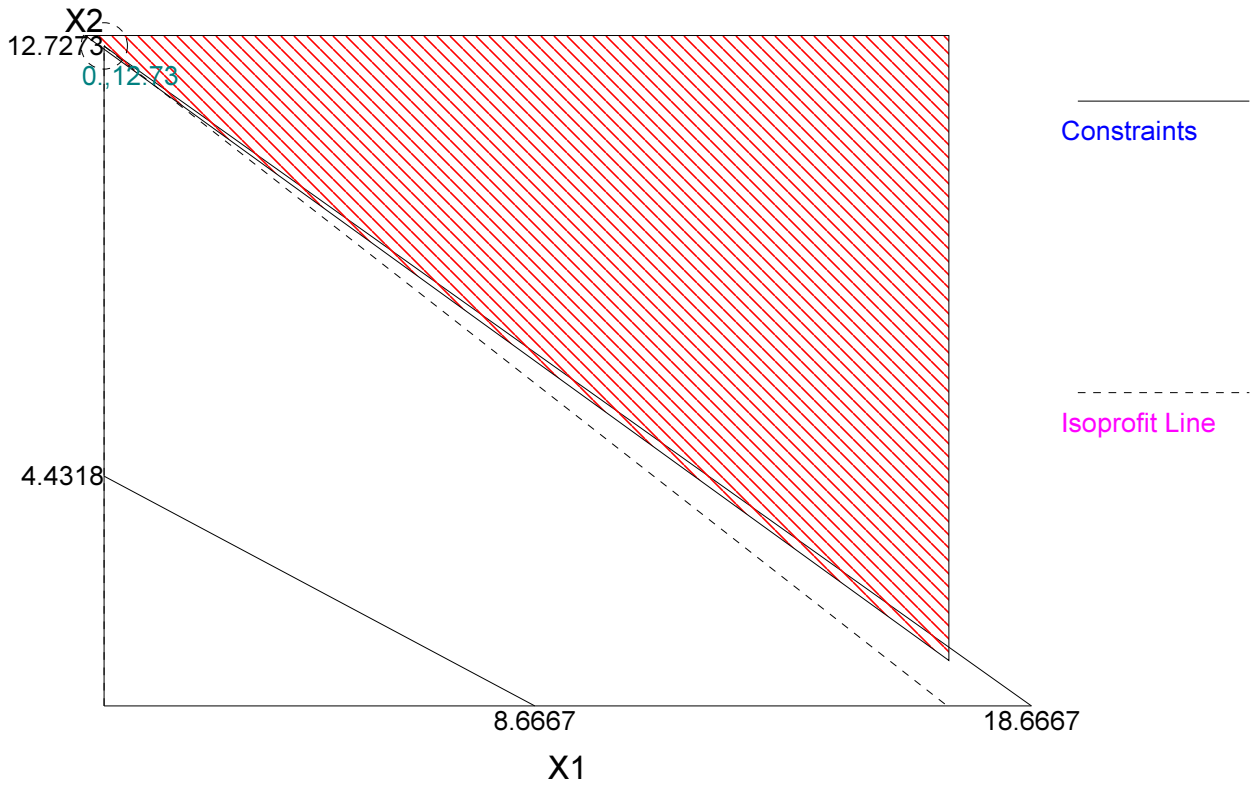
Dual ----------

	y1	y2		
Maximize	280	390		
X1	15	45	<=	9
X2	22	88	<=	12

Intercepts and Intersections ----------

	X1	X2	Cost
Point 1	0	12.7273	152.7273
Point 2	18.6667	0	168

LPP-Example5



Module/submodel: Linear Programming
Problem title: LPP-Min2-Example6
Objective: Minimize

Problem and Results ----------

X1	NONBasic	0
X2	Basic	16.5
surplus 1	NONBasic	0
surplus 2	Basic	104.5
Optimal Value (Z)		594

Ranging ----------

Variable	Value	Reduced Cost	Original Value	Lower Bound	Upper Bound
X1	0	6	18	12	Infinity
X2	16.5	0	36	0	54

Constraint	Dual Value	Slack/ Surplus	Original Value	Lower Bound	Upper Bound
Constraint 1	-6	0	99	9.4286	Infinity
Constraint 2	0	104.5	11	-Infinity	115.5

Original Problem w/answers ----------

	X1	X2		RHS
Minimize	18	36		
Constraint 1	2	6	>=	99
Constraint 2	5	7	>=	11
Solution	**0**	**16.5**		**594**

Iterations ----------

Iteration 1

Cj-->		18	36	0	0	0	0
Basic	Quantity	X1	X2	artfcl 1	surplus 1	artfcl 2	surplus 2
artfcl 1	99	2	6	1	-1	0	0
artfcl 2	11	5	7	0	0	1	-1
zj	110	-7	-13	1	1	1	1
cj-zj		7	13	0	-1	0	-1

Iteration 2

Cj-->		18	36	0	0	0	0
Basic	Quantity	X1	X2	artfcl 1	surplus 1	artfcl 2	surplus 2
artfcl 1	89.5714	-2.2857	0	1	-1	-0.8571	0.8571
X2	1.5714	0.7143	1	0	0	0.1429	-0.1429
zj	89.5714	2.2857	0	1	1	2.8571	-.8571
cj-zj		-2.2857	0	0	-1	-1.8571	0.8571

Iteration 3

Cj-->		18	36	0	0	0	0
Basic	Quantity	X1	X2	artfcl 1	surplus 1	artfcl 2	surplus 2
surplus 2	104.5	-2.6667	0	1.1667	-1.1667	-1	1
X2	16.5	0.3333	1	0.1667	-0.1667	0	0

zj	0	0	0	2	0	2	0
cj-zj		0	0	-1.0	0	-1.0	0

Iteration 4

Cj-->		18	36	0	0	0	0
Basic	Quantity	X1	X2	artfcl 1	surplus 1	artfcl 2	surplus 2
surplus 2	104.5	-2.6667	0	1.1667	-1.1667	-1	1
X2	16.5	0.3333	1	0.1667	-0.1667	0	0
zj	594.0	24	36	-6	6	0	0
cj-zj		-6.0	0	6.0	-6.0	0	0

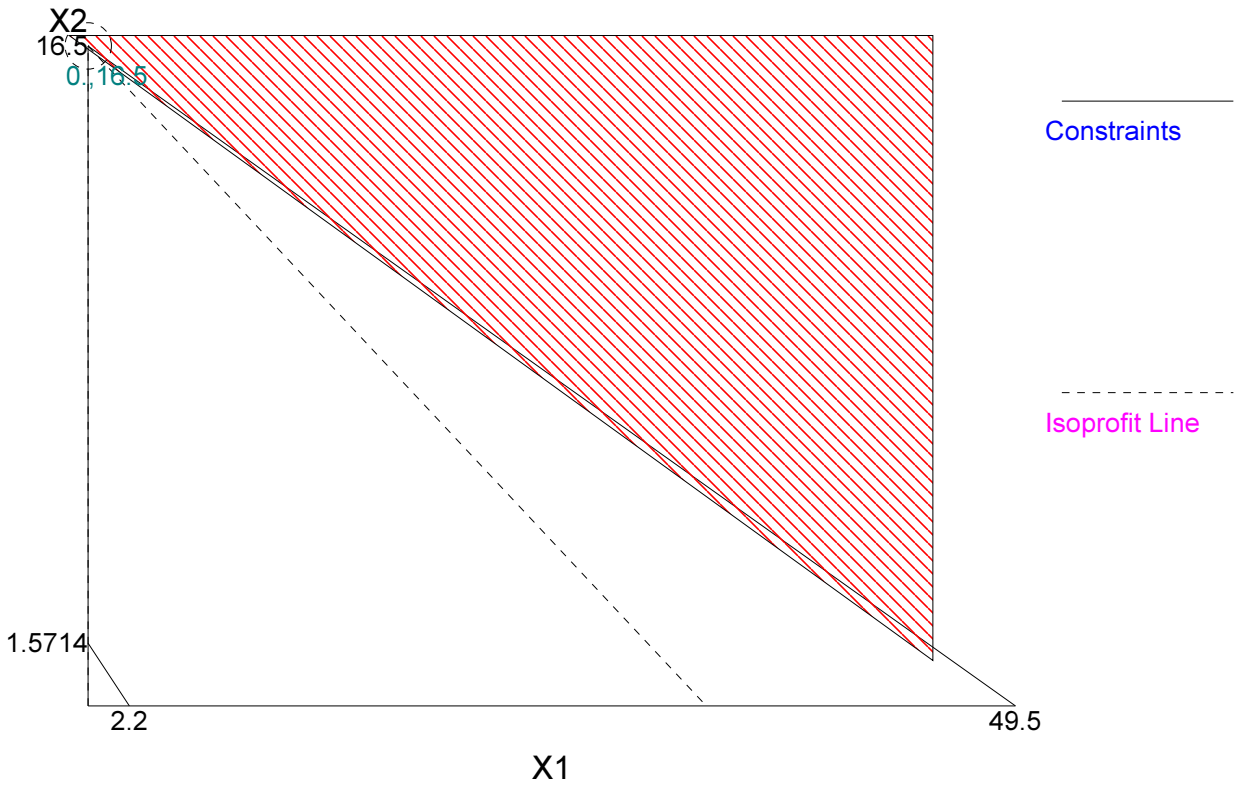
Dual ----------

	y1	y2		
Maximize	99	11		
X1	2	5	<=	18
X2	6	7	<=	36

Intercepts and Intersections ----------

	X1	X2	Cost
Point 1	0	16.5	594
Point 2	49.5	0	891

LPP-Min2-Example6



Module/submodel: Linear Programming
Problem title: LPP-Min3-Example7
Objective: Minimize

Problem and Results ----------

X1	Basic	20
X2	NONBasic	0
X3	NONBasic	0
surplus 1	Basic	60
surplus 2	Basic	40
surplus 3	NONBasic	0
Optimal Value (Z)		200

Ranging ----------

Variable	Value	Reduced Cost	Original Value	Lower Bound	Upper Bound
X1	20	0	10	0	14.0625
X2	0	4.3333	15	10.6667	Infinity
X3	0	8.6667	20	11.3333	Infinity

Constraint	Dual Value	Slack/ Surplus	Original Value	Lower Bound	Upper Bound
Constraint 1	0	60	100	-Infinity	160
Constraint 2	0	40	200	-Infinity	240
Constraint 3	-.6667	0	300	250	Infinity

Original Problem w/answers ----------

	X1	X2	X3		RHS
Minimize	10	15	20		
Constraint 1	8	9	10	>=	100
Constraint 2	12	13	14	>=	200
Constraint 3	15	16	17	>=	300
Solution	**20**	**0**	**0**		**200**

Iterations ----------

Iteration 1

Cj-->		10	15	20	0	0	0	0
Basic	Quantity	X1	X2	X3	artfcl 1	surplus 1	artfcl 2	surplus 2
artfcl 1	100	8	9	10	1	-1	0	0
artfcl 2	200	12	13	14	0	0	1	-1
artfcl 3	300	15	16	17	0	0	0	0
zj	600	-35	-38	-41	1	1	1	1
cj-zj		35	38	41	0	-1	0	-1

Cj-->	0	0
Basic	artfcl 3	surplus 3
artfcl 1	0	0
artfcl 2	0	0
artfcl 3	1	-1
zj	1	1
cj-zj	0	-1

Iteration 2

Cj-->		10	15	20	0	0	0	0
Basic	Quantity	X1	X2	X3	artfcl 1	surplus 1	artfcl 2	surplus 2
X3	10	0.8	0.9	1	0.1	-0.1	0	0
artfcl 2	60	0.8	0.4	0	-1.4	1.4	1	-1
artfcl 3	130	1.4	0.7	0	-1.7	1.7	0	0
zj	190	-2.2	-1.1	0	5.1	-3.1	1	1
cj-zj		2.2	1.1	0	-4.1	3.1	0	-1

Cj-->	0	0
Basic	artfcl 3	surplus 3
X3	0	0
artfcl 2	0	0
artfcl 3	1	-1
zj	1	1
cj-zj	0	-1

Iteration 3

Cj-->		10	15	20	0	0	0	0
Basic	Quantity	X1	X2	X3	artfcl 1	surplus 1	artfcl 2	surplus 2
X3	14.2857	0.8571	0.9286	1	0	0	0.0714	-0.0714
surplus 1	42.8571	0.5714	0.2857	0	-1	1	0.7143	-0.7143
artfcl 3	57.1429	0.4286	0.2143	0	0	0	-1.2143	1.2143
zj	57.1429	-.4286	-.2143	0	2	0	3.2143	-1.2143
cj-zj		0.4286	0.2143	0	-1.0	0	-2.2143	1.2143

Cj-->	0	0
Basic	artfcl 3	surplus 3
X3	0	0
surplus 1	0	0
artfcl 3	1	-1
zj	1	1
cj-zj	0	-1

Iteration 4

Cj-->		10	15	20	0	0	0	0
Basic	Quantity	X1	X2	X3	artfcl 1	surplus 1	artfcl 2	surplus 2
X3	17.6471	0.8824	0.9412	1	0	0	0	0
surplus 1	76.4706	0.8235	0.4118	0	-1	1	0	0
surplus 2	47.0588	0.3529	0.1765	0	0	0	-1	1
zj	0.0	0	0	0	2	0	2	0
cj-zj		0	0	0	-1.0	0	-1.0	0

Cj-->	0	0
Basic	artfcl 3	surplus 3
X3	0.0588	-0.0588
surplus 1	0.5882	-0.5882
surplus 2	0.8235	-0.8235
zj	2	0
cj-zj	-1.0	0

Iteration 5

Cj-->		10	15	20	0	0	0	0
Basic	Quantity	X1	X2	X3	artfcl 1	surplus 1	artfcl 2	surplus 2
X3	17.6471	0.8824	0.9412	1	0	0	0	0
surplus 1	76.4706	0.8235	0.4118	0	-1	1	0	0
surplus 2	47.0588	0.3529	0.1765	0	0	0	-1	1
zj	352.9412	2.3529	11.1765	20	0	0	0	0
cj-zj		7.6471	3.8235	0	0	0	0	0

Cj-->	0	0
Basic	artfcl 3	surplus 3
X3	0.0588	-0.0588
surplus 1	0.5882	-0.5882
surplus 2	0.8235	-0.8235
zj	-1.1765	1.1765
cj-zj	1.1765	-1.1765

Iteration 6

Cj-->		10	15	20	0	0	0	0
Basic	Quantity	X1	X2	X3	artfcl 1	surplus 1	artfcl 2	surplus 2
X1	20.0	1	1.0667	1.1333	0	0	0	0
surplus 1	60.0	0	-0.4667	-0.9333	-1	1	0	0
surplus 2	40.0	0	-0.2	-0.4	0	0	-1	1
zj	200.0	10	19.3333	28.6667	0	0	0	0
cj-zj		0	-4.3333	-8.6667	0	0	0	0

Cj-->	0	0
Basic	artfcl 3	surplus 3
X1	0.0667	-0.0667
surplus 1	0.5333	-0.5333
surplus 2	0.8	-0.8
zj	-.6667	.6667
cj-zj	0.6667	-0.6667

Dual ----------

	y1	y2	y3		
Maximize	100	200	300		
X1	8	12	15	<=	10
X2	9	13	16	<=	15
X3	10	14	17	<=	20