ASSIGNMENT CL643

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SOLVED DIFFERENT

OPTIMIZATION PROBLEMS USING THE SOLVER

GAMS AND IBM CPLEX

LP

MILP

NLP

MNLP

Linear Programming			**CONDITIONS**
	IBM ILOG CPLEX	GAMS	$x_1 + x_2 \leq 700$;
Decision Variable 1 (X_1)	600	600	$x_1 + x_2 \geq 200$;
Decision Variable 2 (X_2)	0	0	$x_1 \leq 600$;
Decision Variable 3 (X_3)	0	0	$x_2 \leq 400$;
Decision Variable 4 (X_4)	400	400	$x_1 \geq 0$;
			$x_2 \geq 0$;
			$x_1 + x_3 = 600$; $x_4 + x_2 = 400$;
Objective function: minimize $5*X_1 + 10*X_2 + 15*X_3 + 4*X_4$	4600	4600	
Non-Linear Programming			**CONDITIONS**
Decision Variable 1 (X_1)	NA	1.035	$x_1^2 - x_2^2 - x_3^2 + x_4^2 \leq 5$;
Decision Variable 2 (X_2)	NA	1.035	$x_1^2 + x_2^2 + x_3^2 + x_4^2 \leq 400$;
Decision Variable 3 (X_3)	NA	14.104	$x_1 + x_2 + x_4 \leq 20$;
Decision Variable 4 (X_4)	NA	14.104	$x_4 + x_2 - x_3 \geq 0$;
Objective function: maximize $X_1*X_2 + X_3*X_4$	NA	200	
Mixed Integer Linear Programming			**CONDITIONS**
Decision Variable 1 (X_1)	50.5	50.5	$x_1 + x_2 \geq 10$; $y_1 + y_2 + y_3 + y_4 \geq 100$;
Decision Variable 2 (X_2)	48.5	48.5	$x_1 + x_2 + x_3 \leq 100$; $x_1 - x_2 \geq 2$;
Decision Variable 3 (X_3)	1	1	$y_1 + y_2 + y_3 + y_4 \leq 200$;
Integer Decision Variable (Y_1)	10	10	$x_3 \geq 1$;
Integer Decision Variable (Y_2)	0	0	$y_2 + 2*y_3 \geq 50$;
Integer Decision Variable (Y_3)	70	70	$y_2 + y_3 \leq 70$;
Integer Decision Variable (Y_4)	120	120	$2* y_3 - y_2 = 20$;
Objective function: maximize $2*(y_1 + y_2) + 2*(y_3 + y_4) + 2*x_1 + 3*x_2 + x_3$;	647.5	647.5	
Mixed Integer Nonlinear Programming			**CONDITIONS**
Decision Variable 1 (X_1)	NA	3	$y_1 * y_2 + \sin(x_2) + x_1 \geq 50$;
Decision Variable 2 (X_2)	NA	1	$y_1 + y_2 \leq 300$; $y_1 + y_2 + x_1 \geq 20$;
Decision Variable 3 (X_3)	NA	2	$x_3 + x_2 - x_1 \geq 0$;
Integer Decision Variable (Y_1)	NA	13	$x_1 \geq 3$; $x_2 \geq 1$; $x_3 \geq 1$;
Integer Decision Variable (Y_2)	NA	4	$1 \leq y_3 \leq 2$;
Integer Decision Variable (Y_3)	NA	1	$x_3 + x_2 - x_1 \leq 120$;
Objective function: minimize $2*(y_1 + y_2) + 2*\pi*x_3^2*x_2 + x_1^3 + y_3^2$;	NA	74.56	$y_1 + y_2 \geq -4$;