ASSIGNMENT 5   CHE 5480

DUE: April 14:   Send through e-mail. Include the GAMS and Excel files and a narrative explaining what was done and how.

#Problem 1
Consider problem 8.33 in Himmelblau.

1- *Reformulate as an Indefinite quadratic problem*
2- *Construct a lower bound model (linear or nonlinear convex) and apply bound contraction to solve.*
3- *Solve to global optimality using branch and bound.*
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#Problem 2
Consider problem 8.38 in Himmelblau.

1- *Solve using Successive Linearization*
2- *Reformulate as an Indefinite quadratic problem.*
3- *Construct a lower bound model (linear or nonlinear convex) and apply bound contraction to solve.*
4- *Use the lower bound model and solve to global optimality using branch and bound.*
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#Problem 3
Consider the following problem:

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\begin{aligned}
\min \quad & 7.5y_1 + 5.5y_2 + 7v_1 + 6v_2 + 5x \\
s.t. \quad & z_1 = 0.9[1 - \exp(-0.5v_1)]x_1 \\
& z_2 = 0.8[1 - \exp(-0.4v_2)]x_2 \\
& x_1 + x_2 - x = 0 \\
& z_1 + z_2 = 10 \\
& v_1 \le 10y_1 \\
& v_2 \le 10y_2 \\
& x_1 \le 20y_1 \\
& x_2 \le 20y_2 \\
& y_1 + y_2 = 1 \\
& x_1, x_2, z_1, z_2, v_1, v_2 \ge 0 \\
& y_1, y_2 \in \{0,1\}^2
\end{aligned}
$$

1- *Reformulate if needed to obtain a convex lower bound.*
2- *Use image discretization on the nonlinear constraints and solve globally (Hint: this is unrelated to question 1*
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