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HW #4

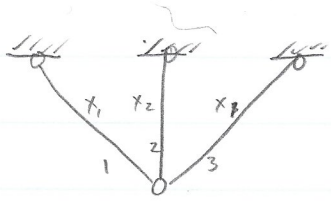
Problem #4

minimize Weight $= W(x_1, x_2) = 2\sqrt{2}\,x_1 + x_2$

$$F_1 = P\,\frac{x_2 + \sqrt{2}\,x_1}{\sqrt{2}\,x_1^2 + 2x_1x_2}\cdot A_1 = \sigma_1 A_1$$

$$F_2 = P\,\frac{1}{x_1 + \sqrt{2}\,x_2}\cdot A_2 = \sigma_2 A_2$$

$$F_3 = P\,\frac{x_2}{\sqrt{2}\,x_1^2 + 2x_1x_2}\cdot A_3 = \sigma_3 A_3$$



$i = 1,2,3$

$A_i \le 5 \qquad \sigma_1 \le 20 \qquad \sigma_2 \le 20 \qquad -15 \le \sigma_3$

$0.1 \le A_j$

$$g_1(x_1, x_2) = P\,\frac{x_2 + \sqrt{2}\,x_1}{\sqrt{2}\,x_1^2 + 2x_1x_2} \le 20 \qquad g_4(A_1) = A_1 \le 5 \qquad g_7(A_1) = 0.1 \le A_1$$

$$g_2(x_1, x_2) = P\,\frac{1}{\sqrt{2}\,x_1^2 + 2x_1x_2} \le 20 \qquad g_5(A_2) = A_2 \le 5 \qquad g_8(A_1) = 0.1 \le A_2$$

$$g_3(x_1, x_2) = -15 \le P\,\frac{x_2}{\sqrt{2}\,x_1^2 + 2x_1x_2} \qquad g_6(A_3) = A_3 \le 5 \qquad g_9(A_1) = 0.1 \le A_3$$

$$L = 2\sqrt{2}\,x_1^* + x_2^* + \sum_{n=1}^{9} P_n\left(g_n + S_n^2\right)$$

Input this into Matlab to determine the optimal values of x_1, x_2, A_1, A_2, A_3, and the subsequent values of $P_1 \to P_9$ and $S_1 \to S_9$