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$$\text{Min} \quad X_1 + X_2$$
$$\text{s.a.} \quad X_1^2 - X_2 \leq 2$$

$X_u^* : (0, -2)$

$$q = f(X_u^*) + p_u \, P(x)$$
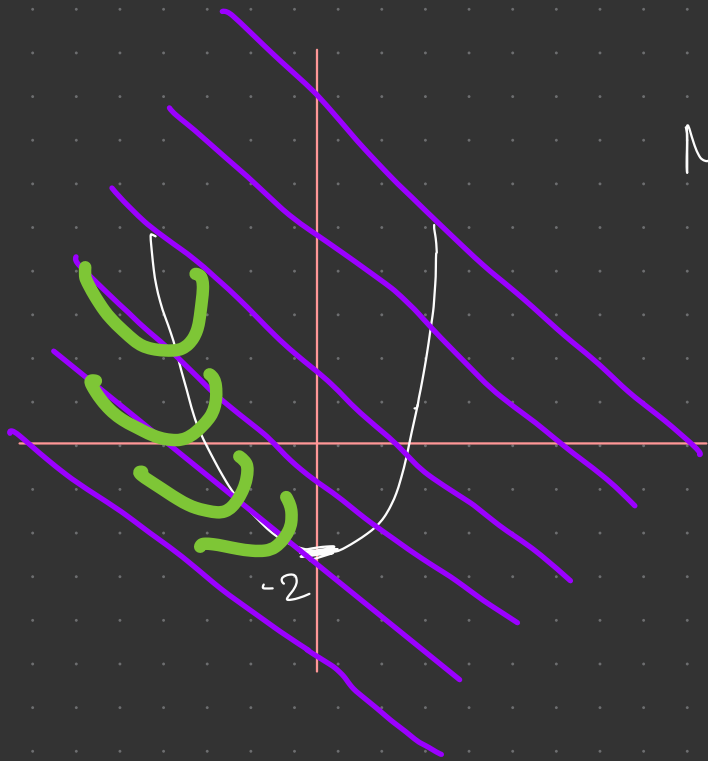
$$q = X_1 + X_2 + p_u \left(X_1^2 - X_2 - 2 \right)^2$$

$$\frac{dq}{dx} = \begin{bmatrix} 1 + 4X_1 \, p_u \, (X_1^2 - X_2 - 2) \\ 1 - 2 p_u (X_1^2 - X_2 - 2) \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \end{bmatrix}$$

$$\cancel{1} + 4 X_1 \, p_u = \cancel{1} - 2 p_u$$

$$4X_1 = -2$$

$$X_1 = -\frac{1}{2}$$

$$1 - 2p_u \left(\left(-\frac{1}{2} \right)^2 - X_2 - 2 \right) = 0$$

$$1 - 2p_u \left(-\frac{7}{4} - X_2 \right) = 0$$

$$1 + \frac{7}{2} p_u + 2 p_u X_2 = 0$$

$$2 p_u X_2 = -1 - \frac{7}{2} p_u$$

$$X_2 = \frac{-1 - 7/2 p_u}{2 p_u}$$

$$X_2 = -\frac{2 + 7 p_u}{4 p_u} \qquad p_u \neq 0$$

$$\lim_{p_u \to \infty} \left(-\frac{2 + 7 p_u}{4 p_u} \right) = \frac{7}{4}$$