

Write a short note on the following two classes of the optimization problems. Do formally define the two classes. Discuss one example problem in each class (preferably a problem with application or practical relevance).

Linear Vs Nonlinear

Write a short note on the following two classes of the optimization problems. Do formally define the two classes. Discuss one example problem in each class (preferably a problem with application or practical relevance).

Convex Vs Non-convex

Write a short note on the following two classes of the optimization problems. Do formally define the two classes. Discuss one example problem in each class (preferably a problem with application or practical relevance.)

Discrete Vs Continuous

Write a short note on the following two classes of the optimization problems. Do formally define the two classes. Discuss one example problem in each class (preferably a problem with application or practical relevance.)

Constrained Vs Unconstrained

Solve the following problem graphically

$$\text{Minimize } z = 5x_1 + 2x_2$$

$$\text{Subject to: } 6x_1 + x_2 \geq 6$$

$$4x_1 + 3x_2 \geq 12$$

$$x_1 + 2x_2 \geq 4$$

Consider the LP

Minimize $c_1x_1 + c_2x_2 + c_3x_3$

Subject to: $x_1 + x_2 \geq 1$

$x_1 + 2x_2 \leq 3$

$x_1 \geq 0; x_2 \geq 0; x_3 \geq 0$

Give the optimal value and the optimal set for the following values of the c (i) $c = (-1, 0, 1)$ (ii) $c = (0, 1, 0)$ (iii) $c = (0, 0, -1)$

Solve the following optimization problem graphically: (Use x_1 as X-axis and x_2 as y-axis.)

$$\text{Max } x_1 + x_2$$

$$\text{s.t } x_1 + x_2 \geq 1$$

$$x_1 + 2x_2 \leq 3$$

$$x_1 - x_2 \leq 2$$

$$x_2 - x_1 \leq 2$$

Note draw a feasible region, indicate all the vertices with coordinates.

