

Decomposition Exercise 5

This exercise is about finding extreme rays.

- Given the problem beneath: Writeup the primal benders sub-problem (including the y variables).
- Start with the value $(y_1, y_2) = (1, 1)$, write the primal-benders-subproblem for these values
- Draw the polyhedron of the primal-benders-subproblem in a coordinate system
- Find the two extreme rays by graphical inspection.
- Find an extreme-ray for the primal benders sub-problem (as it is done in the slides).

Max:

$$-5x_1 - 3x_2 + 3y_1 + 4y_2$$

s.t.:

$$\begin{array}{rcl} 2x_1 - 3x_2 + 2y_1 - 6y_2 & \geq & 9 \\ -x_1 + x_2 + 3y_1 + 3y_2 & \geq & 9 \\ x_1, x_2 \in R^- & y \in \{0, \dots, 10\} & \end{array}$$