General Properties of the MILP Value Function

The value function is subadditive, non-convex, lower semi-continuous, and piecewise polyhedral.

Example 5

$$\begin{aligned} \phi(\beta) = \min\ & x_1 - \frac{3}{4}x_2 + \frac{3}{4}x_3 \\ \text{s.t. } & \frac{5}{4}x_1 - x_2 + \frac{1}{2}x_3 = \beta \qquad \text{(Ex2.MILP)} \\ & x_1, x_2 \in \mathbb{Z}_+,\ x_3 \in \mathbb{R}_+ \end{aligned}$$

□