

Solution to Homework 6

Task. Use straightforward interval computations to estimate the range of the functions from Problems 1 and 2.

Problem 1. We have:

$$\begin{aligned}(4 + [0, 6]) \cdot (2 - [0, 6]) &= ([4, 4] + [0, 6]) \cdot ([2, 2] - [0, 6]) = \\ &= [4 + 0, 4 + 6] \cdot [2 - 6, 2 - 0] = [4, 10] \cdot [-4, 2] = \\ &= [\min(4 \cdot (-4), 4 \cdot 2, 10 \cdot (-4), 10 \cdot 2), \max(4 \cdot (-4), 4 \cdot 2, 10 \cdot (-4), 10 \cdot 2)] = \\ &= [\min(-16, 8, -40, 20), \max(-16, 8, -40, 20)] = [-40, 20].\end{aligned}$$

Problem 2. We have:

$$\begin{aligned}([2, 2] - [0, 6]) \cdot ([4, 4] + [-1, 6]) &= \\ &= [2 - 6, 2 - 0] \cdot [4 + (-1), 4 + 6] = [-4, 2] \cdot [3, 10] = \\ &= [\min((-4) \cdot 3, (-4) \cdot 10, 2 \cdot 3, 2 \cdot 10), \max((-4) \cdot 3, (-4) \cdot 10, 2 \cdot 3, 2 \cdot 10)] = \\ &= [\min(-12, -40, 6, 20), \max(-12, -40, 6, 20)] = [-40, 20].\end{aligned}$$