

SICP: Ex. 2.13, p. 96

Multiplication (Interval Arithmetics):

$$c = ab \quad (1)$$

$$c \pm \Delta_c = (a \pm \Delta_a)(b \pm \Delta_b) \quad (2)$$

$$(3)$$

Lower and Upper Bounds:

$$c_l = (a - a\Delta_a)(b - b\Delta_b) \quad (4)$$

$$c_u = (a + a\Delta_a)(b + b\Delta_b) \quad (5)$$

Interval of Product:

$$\Delta_c = \frac{c_l + c_u}{2} \frac{1}{c} \quad (6)$$

$$\Delta_c = \frac{c_l + c_u}{2c} \quad (7)$$

$$\Delta_c = \frac{c_l + c_u}{2ab} \quad (8)$$

$$\Delta_c = \frac{(a + a\Delta_a)(b + b\Delta_b) + (a - a\Delta_a)(b - b\Delta_b)}{2ab} \quad (9)$$

$$\Delta_c = \frac{ab + ab\Delta_b + ab\Delta_a + ab\Delta_a\Delta_b + ab - ab\Delta_b - ab\Delta_a + ab\Delta_a\Delta_b}{2ab} \quad (10)$$

$$\Delta_c = \frac{ab(1 + \Delta_b + \Delta_a + \Delta_a\Delta_b + 1 - \Delta_b - \Delta_a + \Delta_a\Delta_b)}{2ab} \quad (11)$$

$$\Delta_c = \frac{ab(2 + 2\Delta_a\Delta_b)}{2ab} \quad (12)$$

$$\Delta_c = \frac{2ab(1 + \Delta_a\Delta_b)}{2ab} \quad (13)$$

$$\Delta_c = 1 + \Delta_a\Delta_b \quad (14)$$

$$??? \quad (15)$$