



Computer Architecture II - SS 04
(due: 08.10.2004)

Exercise 1: (Cutting the 3/2 adder in the Exponent Normalizer) (10 + 5 points)

Look at fig. 8.27 in [MP00], page 400: One could speed up this circuit by getting rid of the 3/2 Adder. This is done by combining two of the inputs.

- a.) Show how this can be achieved and that your construction works.
- b.) How does this modification impact the cost and delay of the circuit ExpNorm?

Exercise 2: (Infinity Decision) (5 points)

In circuit ExpRnd (fig. 8.37, MP[00], page 410) there is a box named *Infinity Decision*. Construct this box according to table 8.6 on the same page.

Exercise 3: (Convergence of Newton-Raphson) (5 points)

In the convergence proof of the Newton-Raphson iteration we divided the approximation error δ into three parts:

$$\delta_1 = 1/f_b - (x_i(2 - f_b x_i))$$

$$\delta_2 = x_i(2 - f_b x_i) - x_i A_i$$

$$\delta_3 = x_i A_i - \lfloor x_i A_i \rfloor_\sigma$$

Explain the cause for each δ_i