T-79.179 **Spring 2005**
Parallel and Distributed Digital Systems
Exercise 1
24-30.1.2005

The exercise numbering is identical to the book [Fok00].

2.1.1 Find the basic process terms that belong to the following two process graphs:

2.2.1 Find the process graph that belongs to the basic process term

$$((a+b)\cdot(a+c))\cdot d.$$

Give the derivations of the transitions in this process graph from the transition rules of BPA.

2.3.1 Say for each of the following pairs of basic process terms whether they are bisimilar:

$$(b+c)a+ba+ca \text{ and } ba+ca$$

$$a(b+c)+ab+ac \text{ and } ab+ac$$

$$(a+a)(bc)+(ab)(c+c) \text{ and } (a(b+b))(c+c).$$

For each pair of bisimilar terms, give a bisimulation relation that relates them.

2.3.3 Prove that a^{k+1} and a^{k+2} are not bisimilar for natural numbers k.

2.4.1 Prove that the axioms A1-A3 are equivalent to axiom A3 together with

$$A2' : (x+y)+z = y+(z+x).$$