

## TYPED GRAPHS

## Why

We want to visualize function composition.

## **Definition**

Let G be a graph (directed or undirected) on  $\{1,\ldots,n\}$  and let  $A=(A_1,\ldots,A_n)$  be a list of sets. We call the ordered pair (G,A) a typed graph. We call  $A_i$  the *ith domain*. For  $S \subset \{1,\ldots,n\}$ , we denote the product  $\prod_{s \in S} A_s$  by  $A_s$ .

If G is directed, we call a source vertex exogenous and otherwise we call a vertex endogenous.

Let  $\bar{G} = (G, A)$  be a typed graph where G is directed. Let  $f_i : A_{pa_i} \to A_i$  for  $i = 1, \ldots, n$  so that f is a sequence of functions. We call the ordered pair  $(\bar{G}, f)$  a function graph<sup>1</sup> (or function diagram).

 $<sup>^{1}\</sup>mathrm{This}$  sheet is not to be confused with the graph of a function (see Functions).

