



Why

We want to visualize function composition.

Definition

A *composition graph* (or *composition diagram*) is a directed graph along with a map from vertices to the powerset of a set and a map from edges to functions between sets associated with incident vertices.

Example

For example, let A and R be sets and let $i : A \rightarrow A$, $f : A \rightarrow R$ and $g : R \rightarrow A$ be functions. We can consider the diagram whose graph is $(\{1, 2, 3\}, \{(1, 2), (2, 3), (1, 3)\})$, with vertices one and three corresponding to A , vertex 2 corresponding to R , edge $(1, 2)$ corresponding to f , edge $(2, 3)$ corresponding to g and edge $(1, 3)$ corresponding to i .¹

Path composition

The function associated with a path (or *path composition*) is the composition of the functions corresponding to the edges along the path. The diagram is *commutative* (call a *commutative diagram*) if the composition of any two paths between any two vertices result in identical functions.

¹Future editions will include the highly important figures associated with function diagrams.

