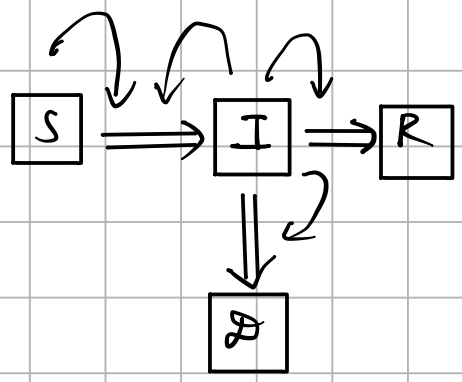
"John Baez on Epidemiology."



S, I, R, D → stocks

i, r, d → flow

(flow func.) ↴ → links

Diagrams >> Solving Differential Eq.

Anylogic → Software to model stock flow

⇓

Has disadvantages : * no support for composing
* no support for stratifying

* not open source

Splitting one stock to many (for disease we need to divide S to old, young people for accuracy)

* Cat. Theory ⇔ compositional modelling :

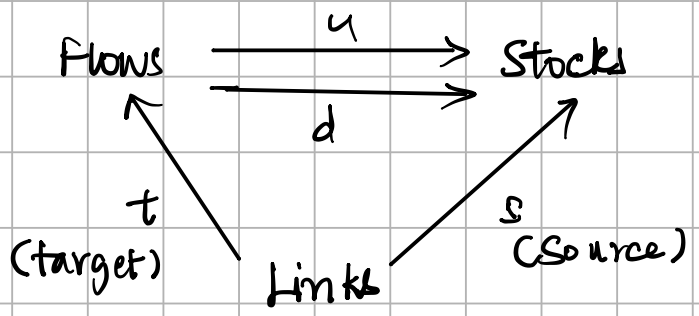
① Converting models to system of diff. eq.

is a functor b/w categories

② Composing morphisms ⇔ composing models to make complex models

Software used : AlgebraicJulia ⇒ upflow, downflow

SIMPLEST form of stock flow dia

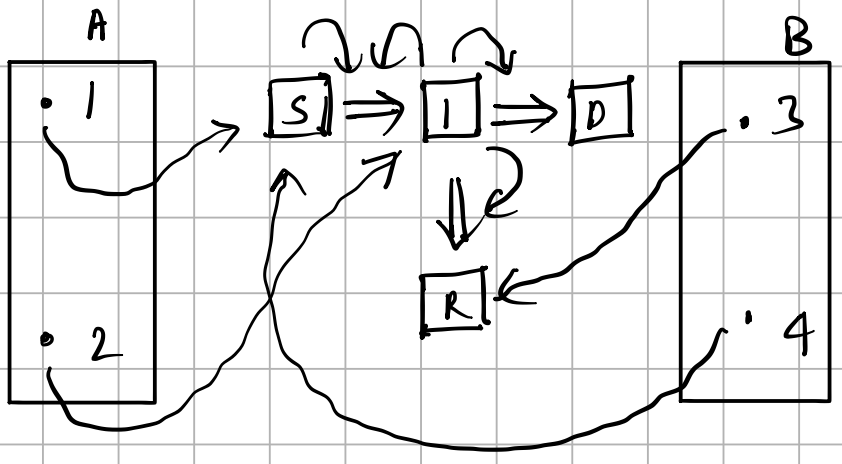


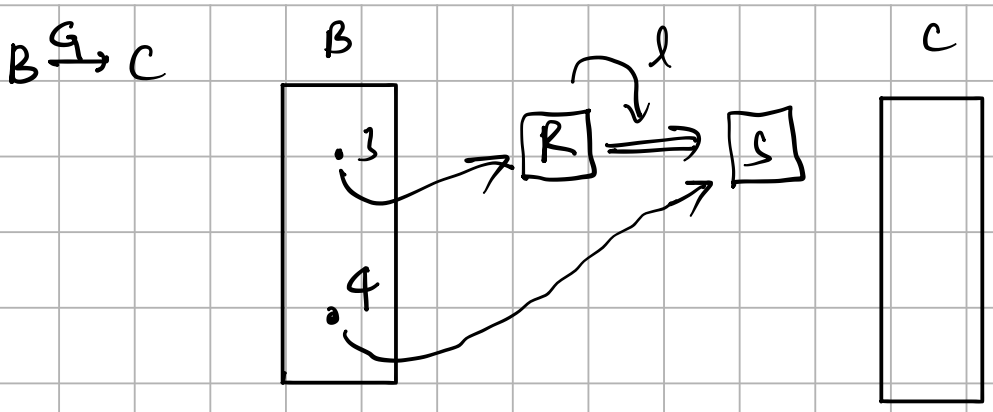
* OPEN STOCKFLOW DIAGRAMS :

⇒ Stock-flow dia. equipped with two sets & two maps i, o from the sets to stock flow which serves as OPEN END to the dia.

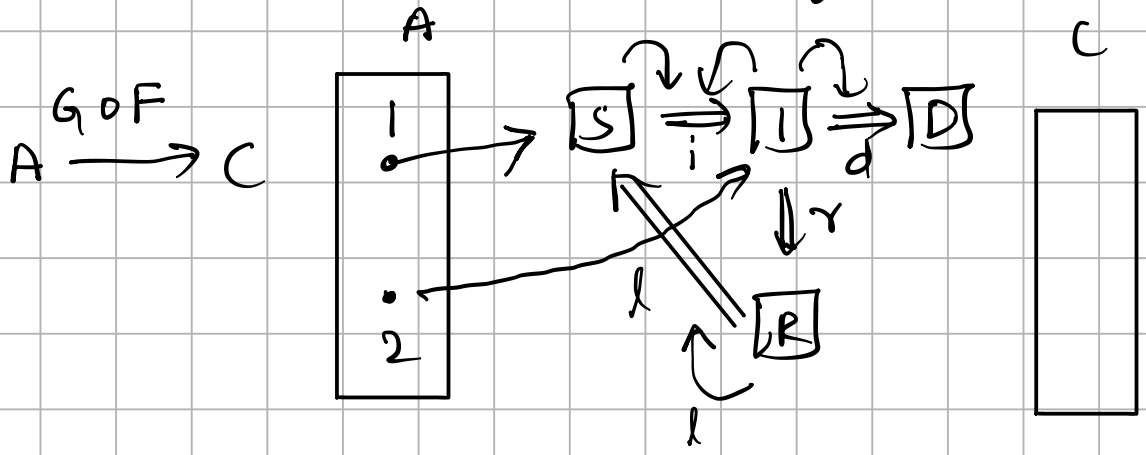
⇒ we can compose 2 stockflow by gluing this open ends of each one.

Eg : $A \xrightarrow{F} B$





Now by composing above 2 by gluing B ends,



For turning the stock flow dia. → dynamical sys

ϕ : FUNCTOR open(Stockflow) $\xrightarrow{\Phi}$ open(dynam)

* GUI for Stock Flow in Julia : Modelcollab

NEED TO SEE THESE TO GO FURTHER

Symmetrical monoidal category

Petri Nets ⇑ OPEN ⇓ Structured co spans

coproducts Double Category

Pushouts & Pullbacks

limits & co-limits

left & right adjoint

Isomorphism classes