

Graph -  
Set of  
Vertices  
Set of  
Edges

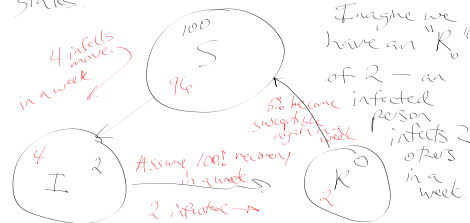
This is a directed graph.  
Our SIR model graph.

This graph has only one edge  
between two vertices (at most);  
some have more;



Not  
simple -  
more than  
one edge  
between  
vertices.

Back to Covid: let's determine  
the rates of flows between the  
states.



Notation:  $\Delta I_{out}$  - change out (to R)  
 $\Delta I_{in}$

$$\Delta R_{in} = \Delta I_{out} = I \cdot I$$

$$\Delta R_{out} = \Delta S_{in} = \frac{1}{20} R = 0.05 R$$

$$\Delta S_{out} = \Delta I_{in} = (R_0) IS \cdot \left(\frac{1}{N}\right)$$

One over the total population N.  
1: in both I + S

