

Readings on the papers

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May 19, 2017

1 What I need to do?

To create a SIR model of two cities with different R_0 's connected by a transport and figure out the R_0 of the new connected system.

From readings of paper I, Day I

The calculations of individual city R_0 depends on the SIR model of the particular city, ie, It does not account for the transportation term or the city is considered to be a closed system.

Intrinsic R_0

But the R_0 depends only on the parameters α and β which are dependent only on the disease. So, How come the two cities can have different R_0 for the same disease.

[Todo: Figure out \$R_0\$ is defined and how do we calculate it for a model.](#)

2 Modeling the Worldwide Spread of Pandemic Influenza: Baseline Case and Containment Interventions

Meta population stochastic epidemic model

This also considers the airline flow travel.

Network Vertices are Cities and weighted edges represent the rate of passenger flow. Each vertice with a weight representing the population.

The Model

We use **SLIR** model.

The Stochastic transport operator

ω acts as a coupling term between the equations. [To read about](#)

Langevin formulation [Todo](#)

Discrete nature of Individuals

They have used a special type of calculation to account for the discreteness of the Individuals. [To see Text S1 and figure out](#)

[Since \$R_0\$ is function of the disease parameters, technically the \$R_0\$'s of all the cities must be the same. Since \$R_0\$ doesn't depend on \$\omega\$. Here in this paper we](#)

have different R_0 's due to seasonality changes. ie, their transmission coefficient β is different due to seasons. Should we also consider giving different β values to different cities to create cities with different R_0 's?