Week 16-27 October, 2017

a) Extending k-path Laplacian concept to weighted networks.

b) In heat diffusion over network, the equilibrium state is completely determined from the kernel of the Laplacian matrix that is $ker(\mathbf{L}) = \{\mathbf{v}|\mathbf{Lv} = \mathbf{0}\}$. This still holds for diffusion over longrange interaction. On the otherhand, the diffusion kernel or heat diffusion is given by e^{-CL}. how are the two concepts different and which one should we explore?

c) Suppose equilibrium state in diffusion of heat on a given network occurs at a time t. is the average heat for most central nodes at half time $t_{1/2}$ any closer to the quantity at each node at equilibrium?

d) Consider laplacian centrality for nodes taking into account longrange interaction

e) Compute the ratio of degree to generalised degree for each node. What insights do we obtain from this?

f) Look at how stability in networks is related to longrange interactions. What is the impact of longrange interactions to group and individual behaviour for instance in flocks?