K-Shell Decomposition for Dynamic Complex Networks

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- epidemics - a sudden, widespread occurrence of an undesirable phenomenon.

* Abstract -

- Eigenvector Centrality:

It assigns relative scores to all nodes in the network based on the concept that connections to high-scoring node contribute more to the score of the node in question than equal connections to low-scoring nodes.

Pagerank is variants of the eigenvector centrality.

Relative centrality score of vertex v $x_v = \frac{1}{\lambda} \sum_{t \in M(v)} x_t = \frac{1}{\lambda} \sum_{t \in G} a_{v,t} x_t$

$M(v)$ = set of the neighbors of v

λ = constant

$a_{v,t}$ = 1 if vertex v is linked to vertex t

0 Otherwise.

$$Ax = \lambda x$$

For node i, the ith component of the ~~re~~ eigenvector associated to the maximal eigenvalue of the adjacency matrix associated to the graph.

- intermittent - occurring at irregular intervals

- gauge - estimate the amount, level of.

- Probability Space $\langle \Omega, F, P \rangle$

1. A sample space, Ω, which is the set of all possible outcome.
2. A set of events F, where each event is a set containing zero or more outcomes.
3. The assignment of probabilities to the events; that is, a function P from events to probabilities.

- Stationary ergodic process is a stochastic process which exhibits both stationary & ergodicity. In essence this implies that the random process will not change its statistical properties with time and that its statistical properties (such as theoritical mean & variance of the process) can be deduced from a single, sufficiently long sample (realization) of the process.

- Dirac Measure assigns a size to a set based solely on whether it contains a fixed element x or not.

$$\delta_x(E) = \begin{cases} 1 & \text{if } x \in E \\ 0 & \text{if } x \notin E \end{cases}$$

- $\{Y_n\} = \{T_n - T_{n-1}\}$

$0 < \lambda < \infty \Rightarrow \langle Y_n \rangle$ has finite mean under P.

λ - the expected no. of points in the interval $[0,1)$

$$\text{Mean of } \langle Y_n \rangle = \frac{T_{end} - T_{start}}{N(R)} \; \cancel{\approx \text{Mean of } \{Y_n\}_{[0,1)} = \lambda}$$

Mean of $\langle Y_n \rangle$ over R = Mean of $\langle Y_n \rangle$ over $[0,1)$ $\left[\because \text{ergodicity}\right.$

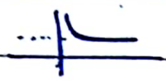
Mean of $\{Y_n\}$ over $[0,1)$ $= \dfrac{T_{end} - T_{start}}{N([0,1))} = \dfrac{T_{end} - T_{start}}{\lambda}$

$0 \leq T_{end} < 1$ $\qquad\qquad = $ Finite.

$0 \leq T_{start} < 1$

$N([0,1)) = \lambda$

- maximal subgraph of given graph G is maximal for a particular property if it has that property but no other supergraph of it that is also a subgraph of G also has the same property. That is, it is a maximal element of the subgraphs with the property.

- heavy-tailed distributions are probability distributions whose tails are not exponentially bounded. 

- Pareto distribution is a power law probability distribution.

- disseminate - spread widely.