X.2. Local preferential attachment.

X.2.1 ILFM

For ILFM, the situation wrt to local preferential attachment is very similar to the one for global preferential attachment. This is due to the fact that, ~~a test~~ in $\mathcal{M}_e$ (i.e given F and Φ), a local degree can be defined in the same way as the global degree above.

Considering the same generative process as before, for $\mathcal{M}_e$ wl ILFM, the local degree in class k, $1 \leq k \leq K$, for a node i such that $f_{ik} = 1$ is defined by:

$$d_{i,k}^{(p)} = \sum_{j=1,\, f_{jk}=1}^{p} y_{ij}$$

Note that if $f_{ik} = 0$, $d_{i,k}^{(p)} = 0$ for all p.

This then leads to the following definition of the local preferential attachment for ILFM.

Definition (ILFM - local preferential attachment): ~~Let $\mathcal{M}_e$ be a model ($\mathcal{M}_g$ or $\mathcal{M}_l$) associated to ILFM.~~ We say that ILFM in $\forall\, \mathcal{M}_e$ satisfies the local preferential attachment effect iff for any indexing, for any node i $(1 \leq i \leq N)$*, for any step p $(1 \leq p < N)$:

$$P(d_{i,k}^{(N)} \geq n+1 \mid d_{i,k}^{(p)} = n; \mathcal{M}_e) \text{ increases with } n, \quad 1 \leq n < p.$$

If $P(d_{i,k}^{(N)} \geq n+1 \mid d_i^{(p)} = n; \mathcal{M}_e)$ is independent of n, ~~we say that~~ the model is said to be ~~ILFM~~ neutral wrt to the local preferential attachment effect.

* such that $f_{ik} = 1$