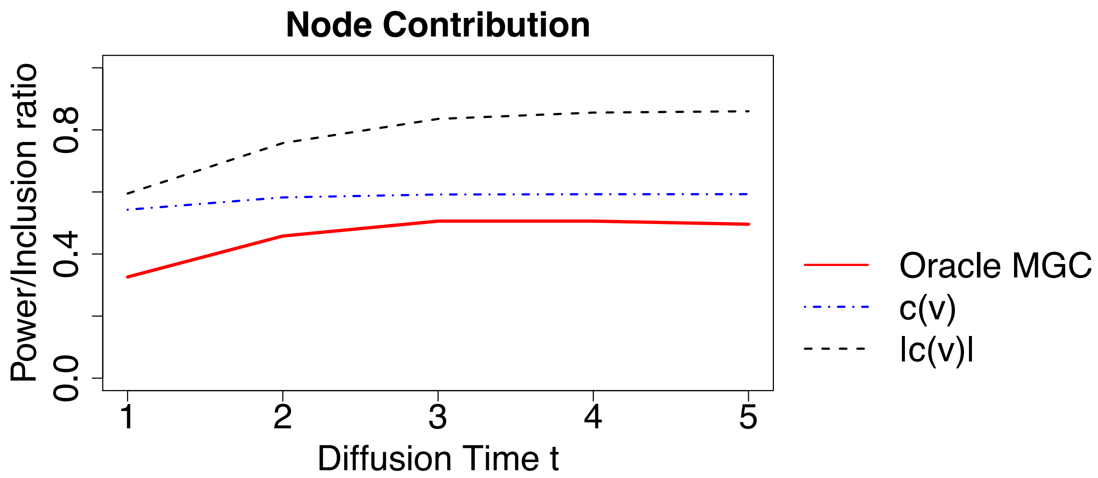

Figure 16: Change of empirical power and inclusion rate at each diffusion time $t = 1, \ldots, 5$. You can see that inclusion rate of $|c(v)|$ increases as empirical power of MGC increases.

A.4 Monotonicity and Power

1. $$Power(\theta) = E(A_{ij}|X_i, X_j) = 0.5I(|X_i - X_j| = 0) + 0.1I(|X_i - X_j| = 1) + \theta I(|X_i - X_j| = 2) \quad (32)$$

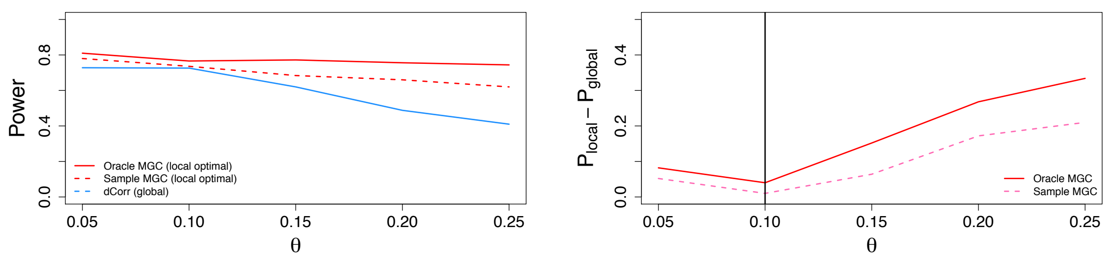

Figure 17: Change of empirical power across θ in both local and global scale of distance correlation (left). Change of difference between these two powers in Oracle and Sample MGC. Superiority of optimal local scale become evident from $\theta > 0.1$, when distribution of edges have non-linear dependence on X.

2. $$Power(\theta) = E(A_{ij}|X_i, X_j) = 0.2I(|X_i - X_j| = 0) + 0.8I(|X_i - X_j| = 1) + \theta I(|X_i - X_j| = 2) \quad (33)$$

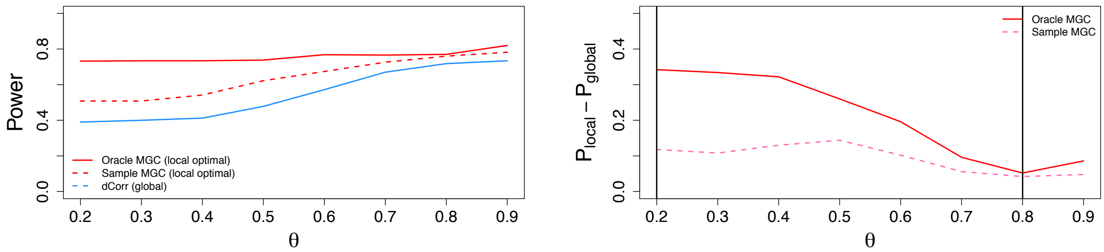

Figure 18: Change of empirical power across θ in both local and global scale of distance correlation (left). Change of difference between these two powers in Oracle and Sample `MGC`. Superiority of optimal local scale become evident from $\theta < 0.8$, when distribution of edges have non-linear dependence on X.

3. $$Power(\theta) = E(A_{ij}|X_i, X_j) = 0.5I(|X_i - X_j| = 0) + 0.5I(|X_i - X_j| = 1) + \theta I(|X_i - X_j| = 2) \quad (34)$$

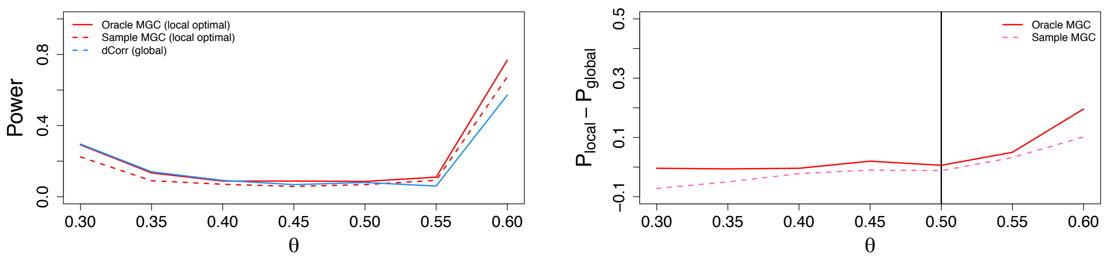

Figure 19: Change of empirical power across θ in both local and global scale of distance correlation (left). Change of difference between these two powers in Oracle and Sample `MGC`. Across all $\theta > 0$, we have linear dependency.