

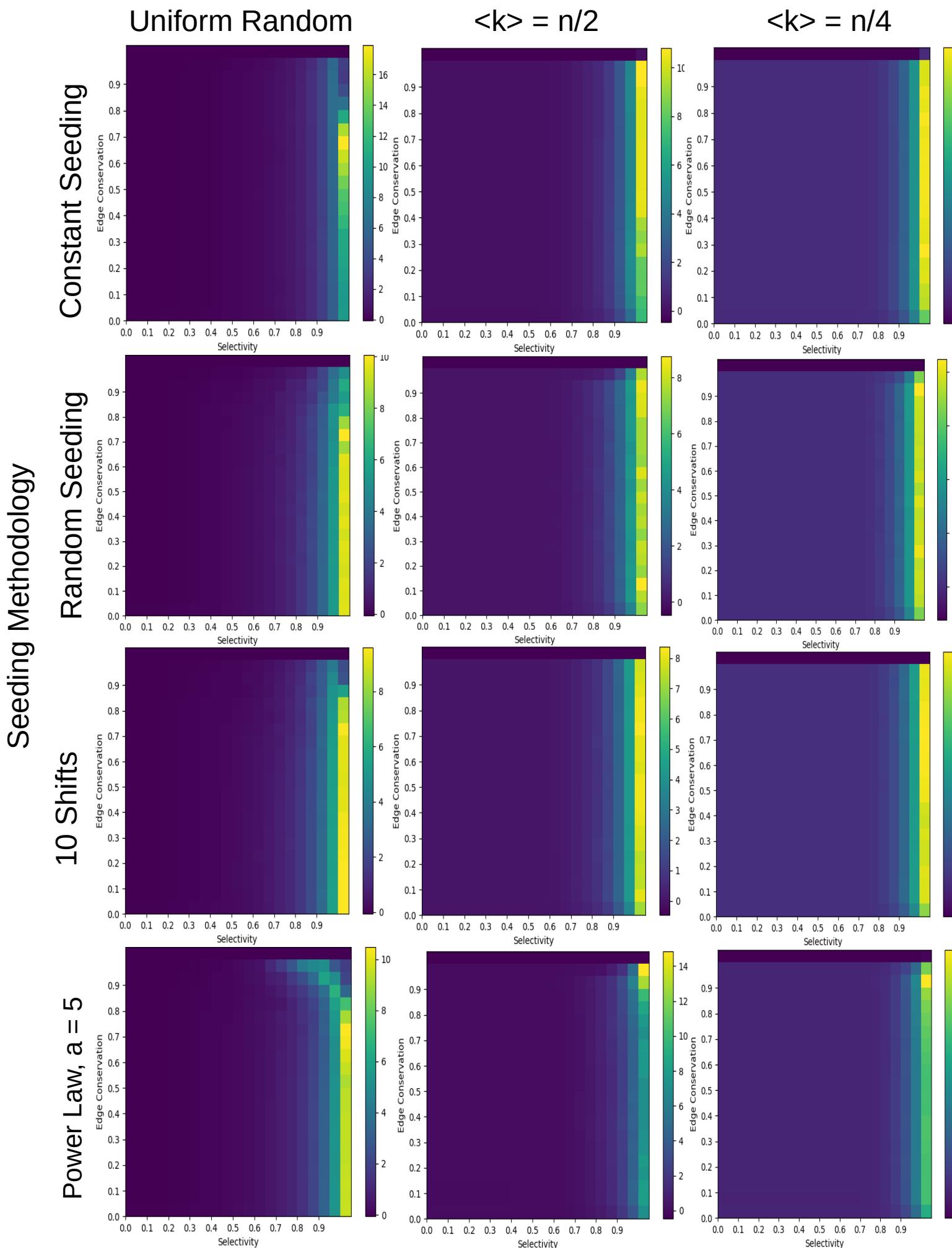
# Grid-Search Plots

- 60 Nodes
- 25 Simulations per Ensemble
- 10 delta parameter value
- 600 Runs maximum
- 200 Run equilibrium distance
- K ranges of  $k=n/4, n/2, n$
- For effective distances, lower (darker) numbers are better:

$$\text{Eff. Dist. Diff} = \text{ED}_{\text{final}} - \text{ED}_{\text{Initial}}$$

# Average All to All Effective Distances Differences

## Network Structures

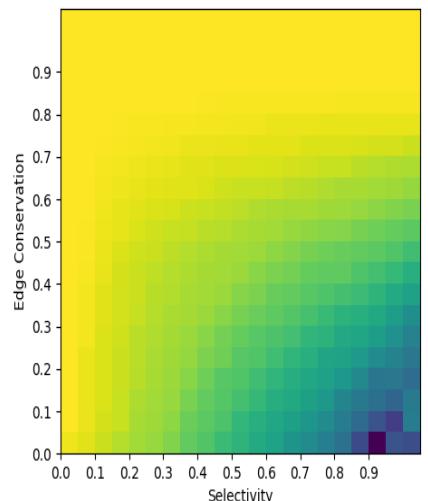


# Effective Distance to Source Network Structures

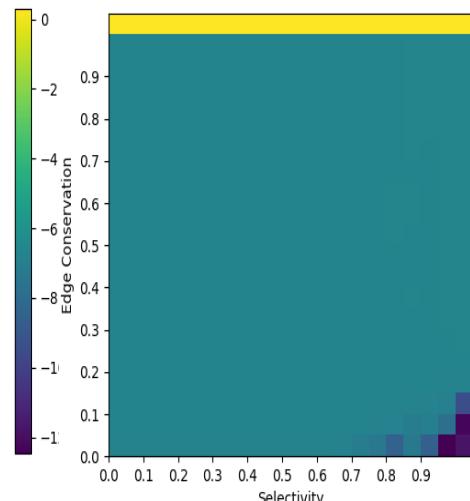
**Eff. Dist. Differences**

**Eff. Dist. Averages Over Entire Simulation**

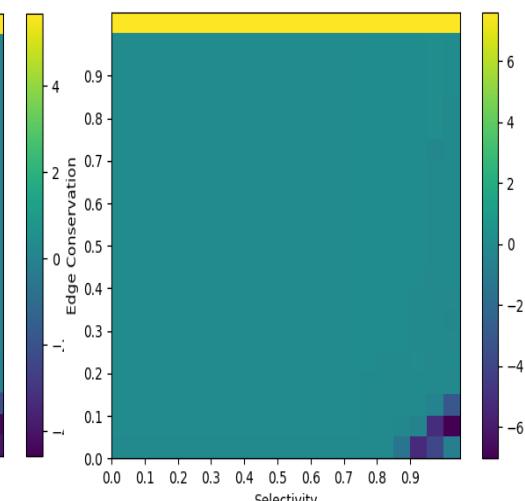
**Constant Seeding**



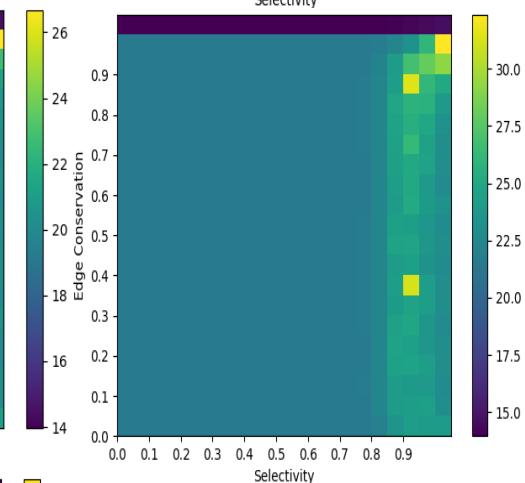
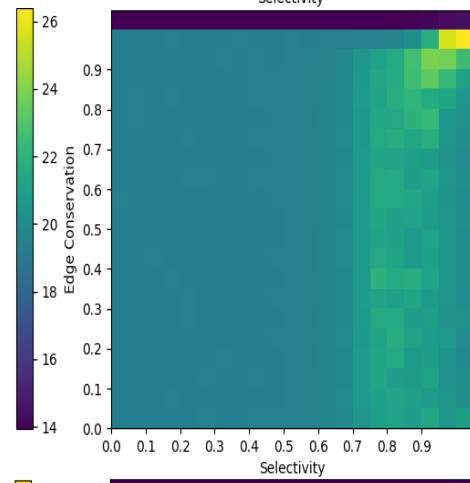
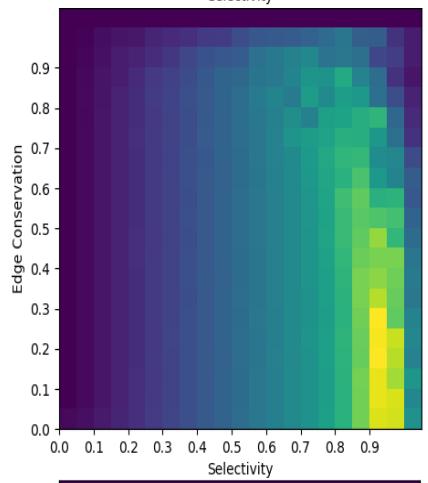
**$\langle k \rangle = n/2$**



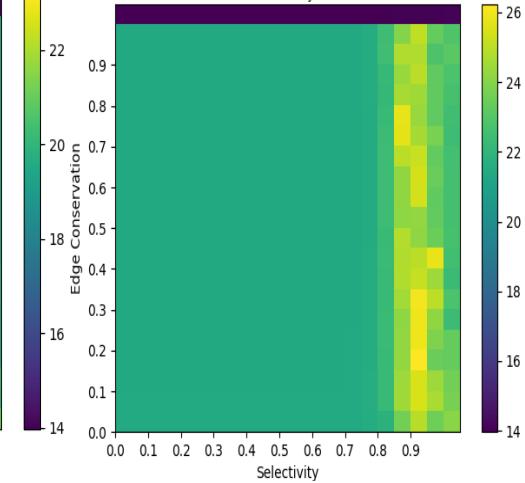
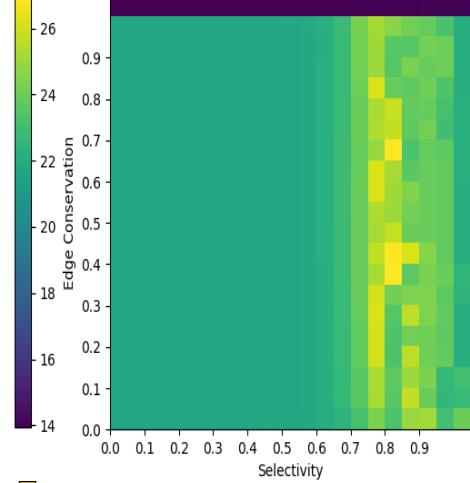
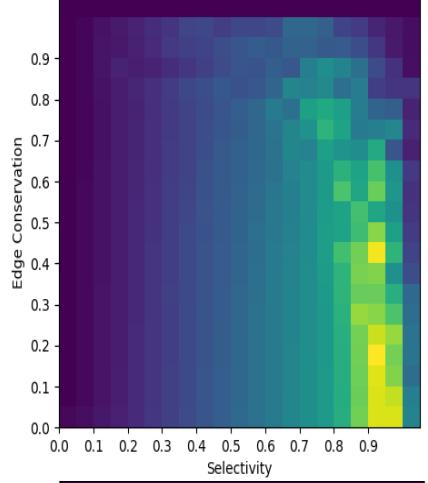
**$\langle k \rangle = n/4$**



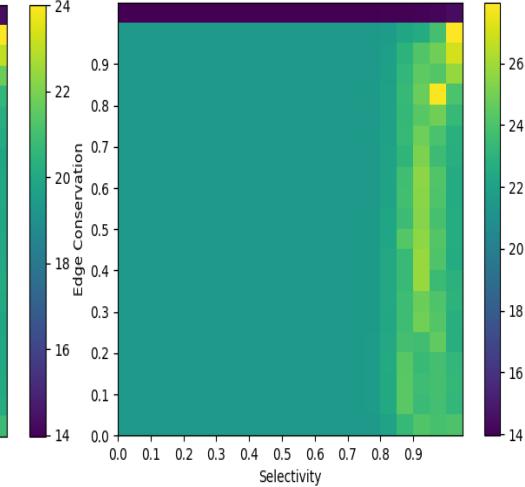
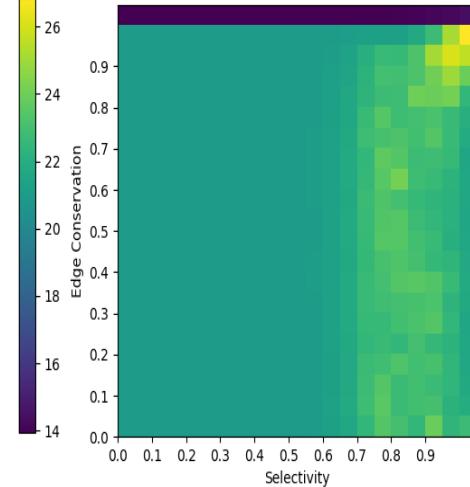
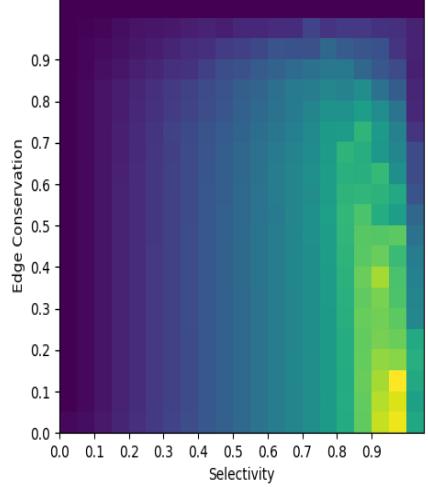
**Random Seeding**



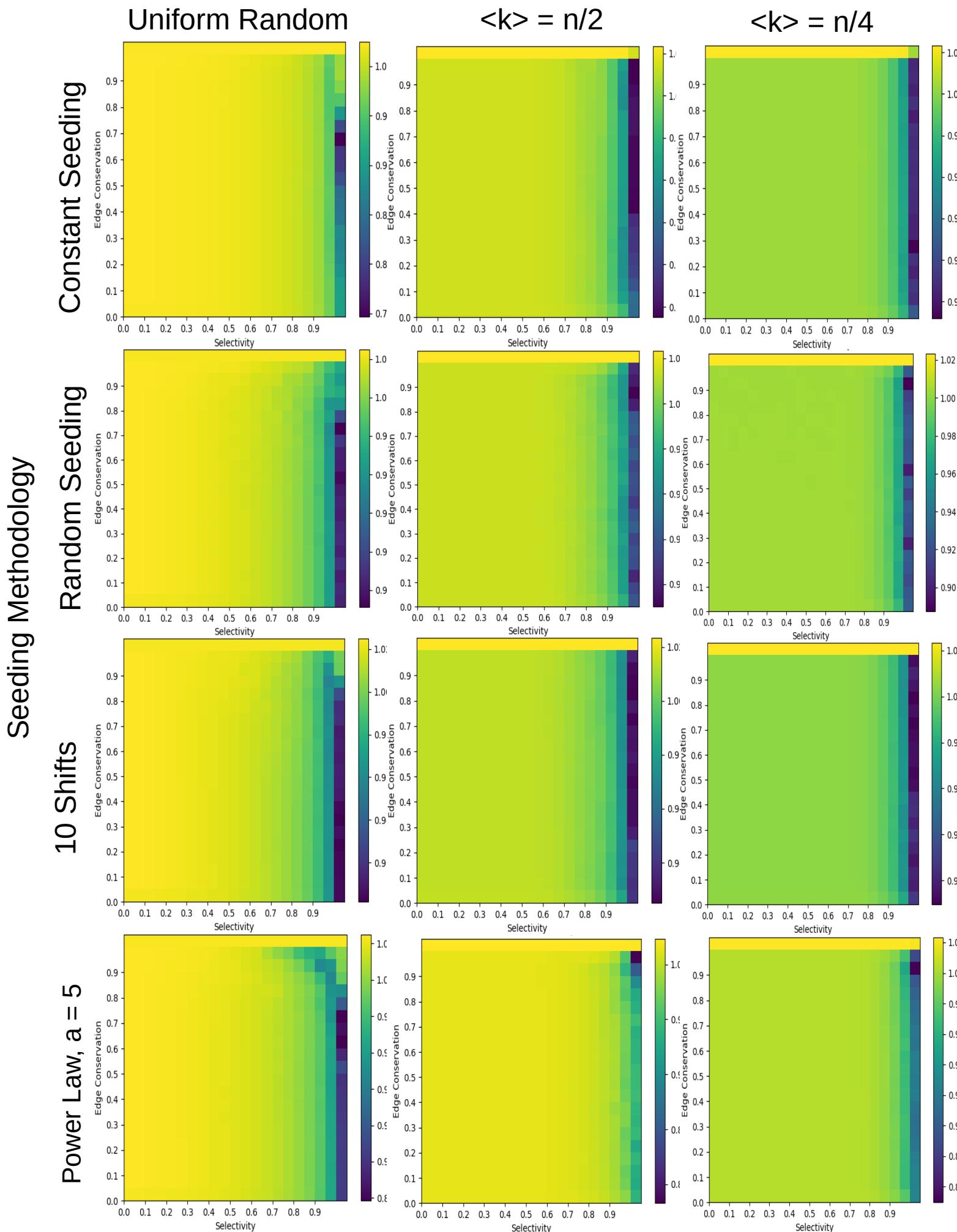
**10 Shifts**



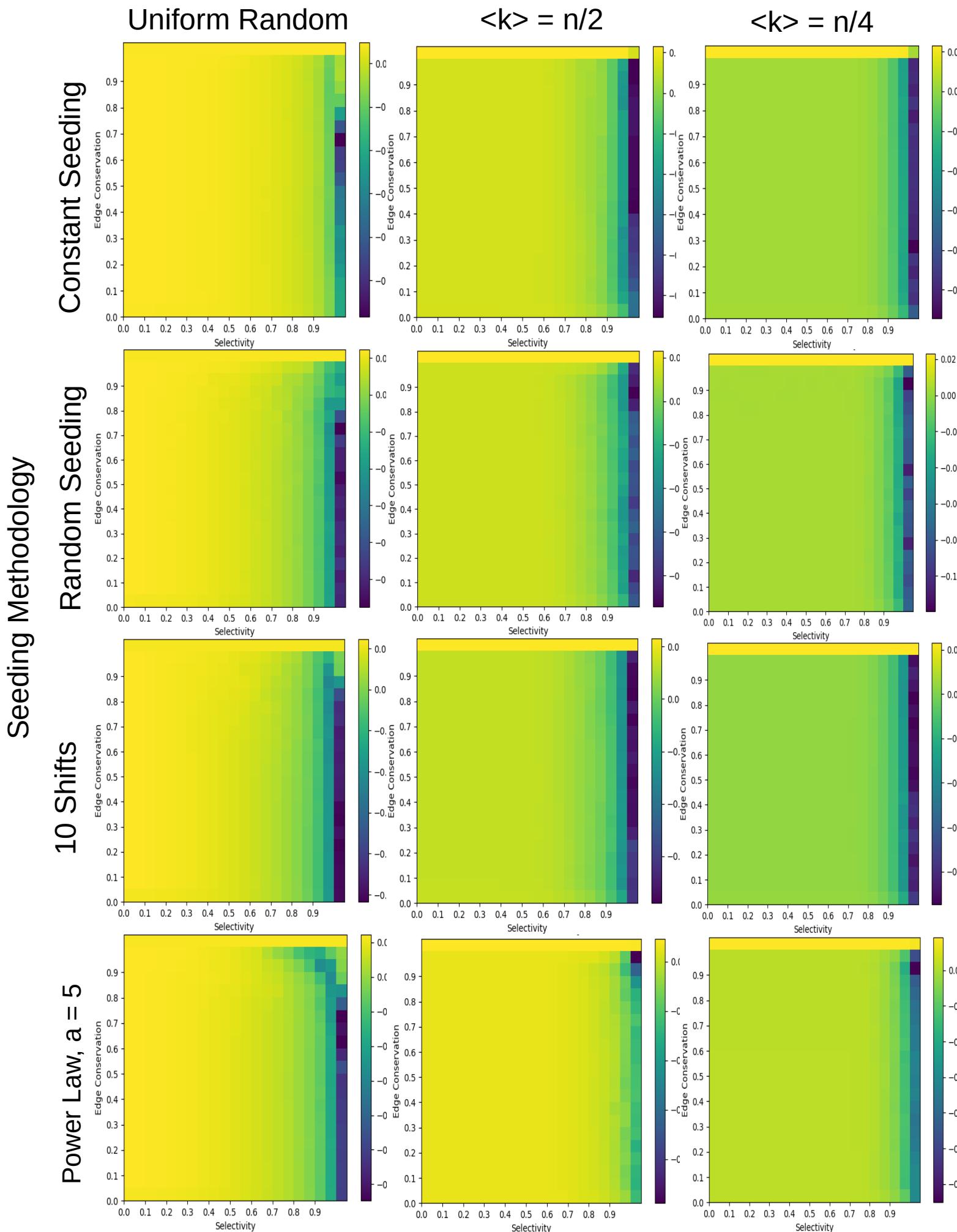
**Power Law,  $\alpha = 5$**



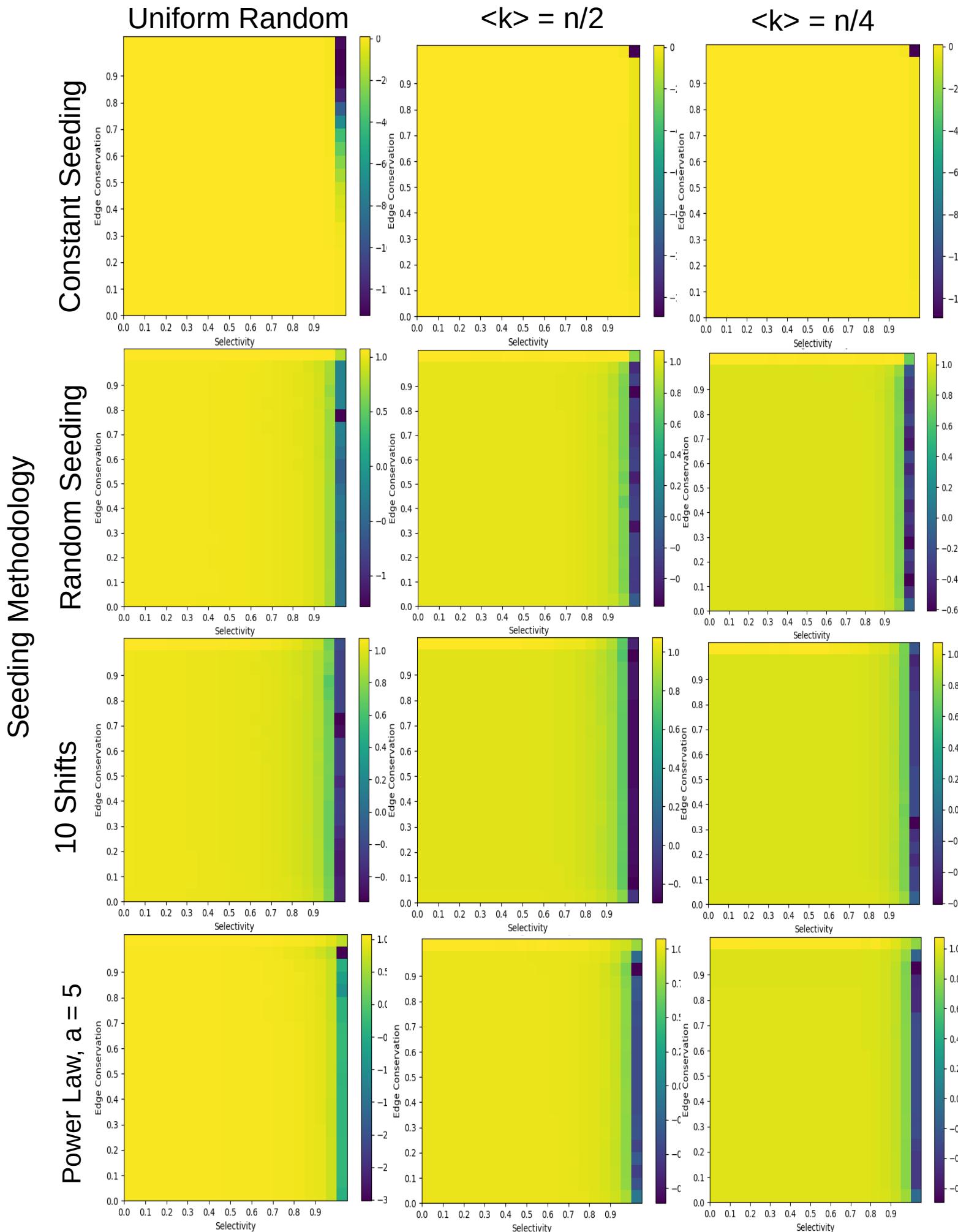
# Diffusion Efficiencies ( $E_{\text{Diff}}$ )



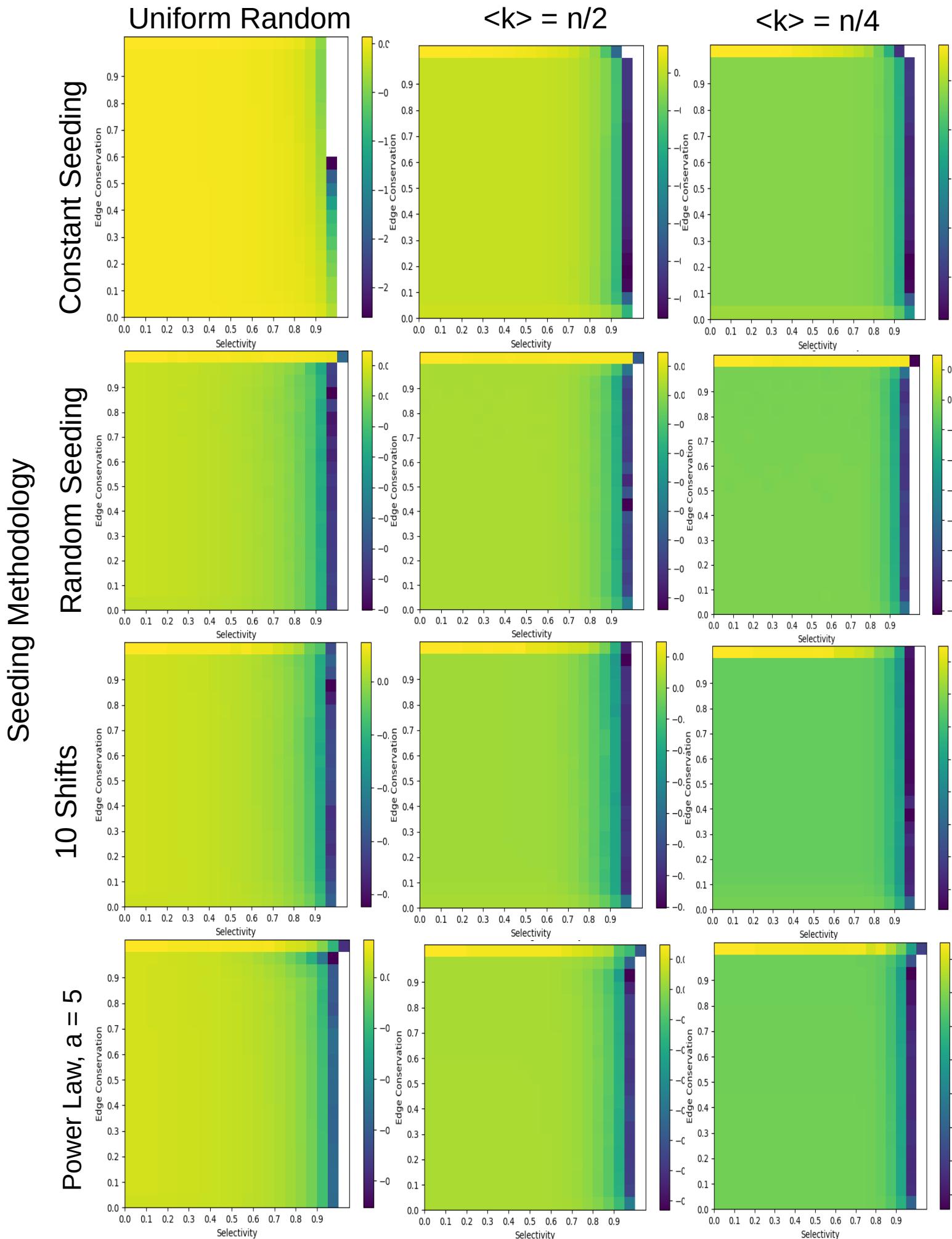
# Log Diffusion Efficiencies ( $E_{\text{Diff}}$ )



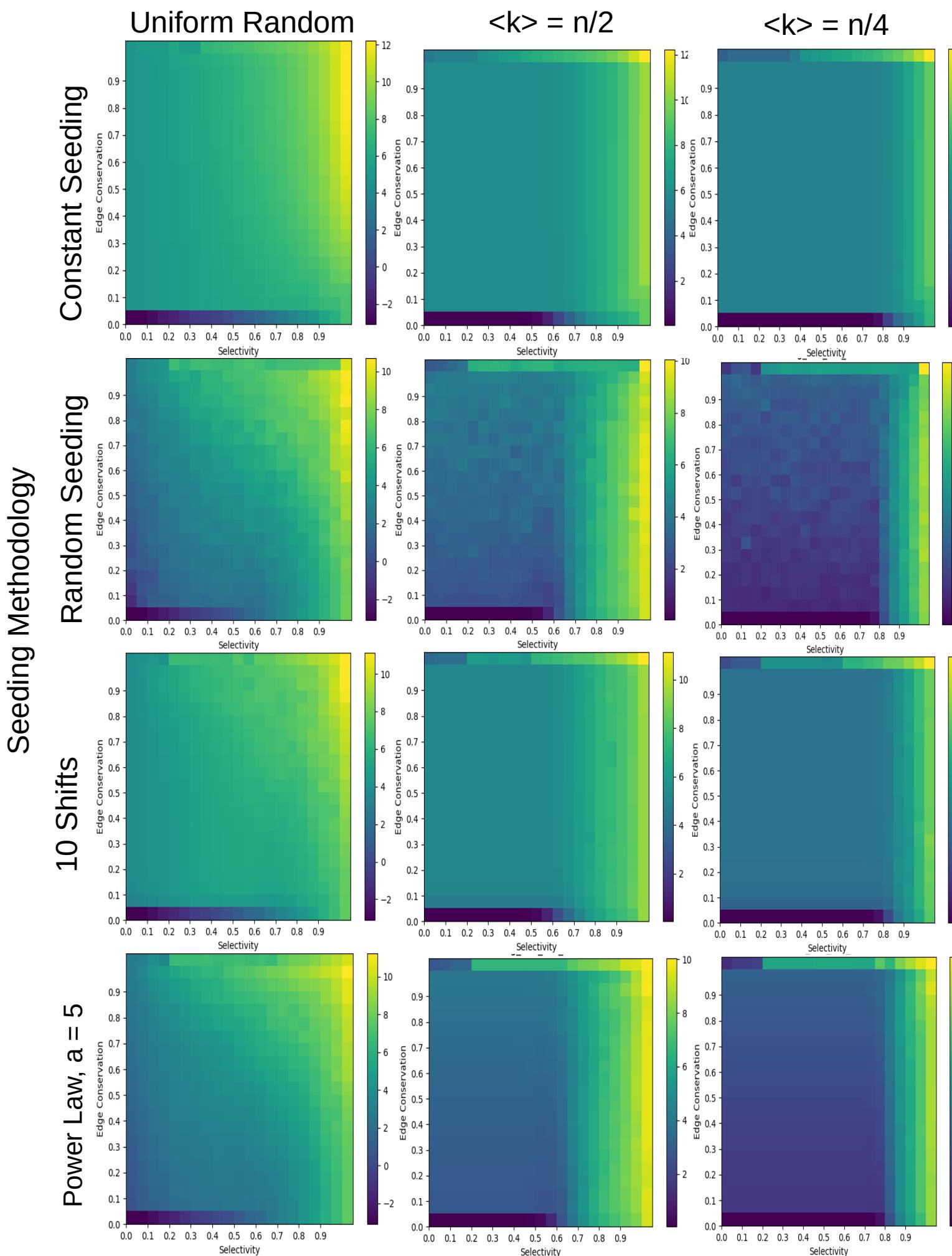
# Routing Efficiencies ( $E_{\text{Routing}}$ )



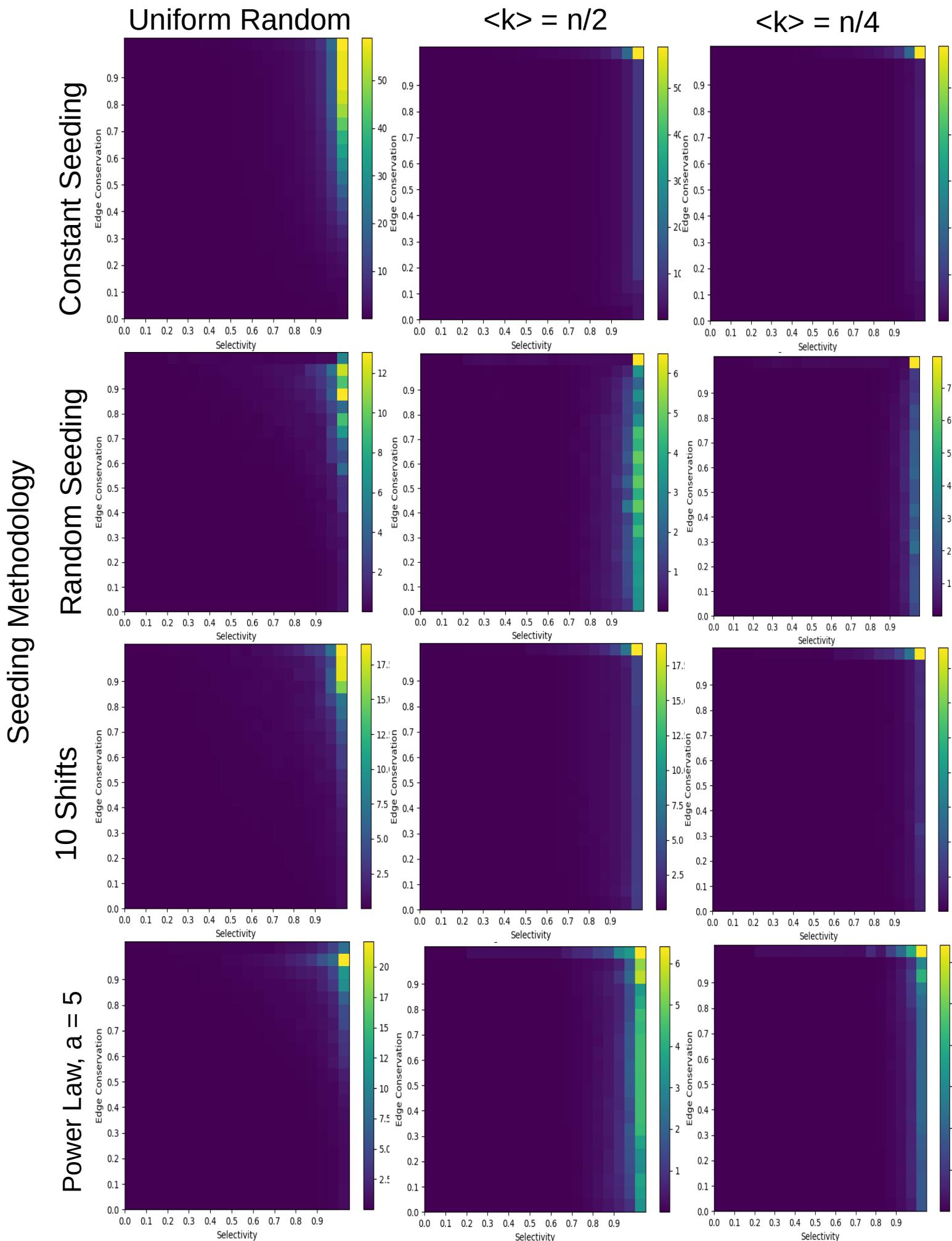
# Log Routing Efficiencies ( $E_{\text{Routing}}$ )



# Log Average Neighbor Variance Network Structures



# Log Average Degree Variance Network Structures



# Hierarchy Coordinates

- As Initially developed in:  
Hierarchy in complex networks: the possible and the actual [Corominas-Murtra et al.]
- Darker color points indicate higher selectivity/edge conservation values
- Adapted to weighted graphs by averaging over unweighted versions determined via exponentially or linearly distributed thresholds

# Efficiency Morphospaces

- From Exploring the Morphospace of Communication Efficiency in Complex Networks [Goni et al. 2013]
- Adapted from unweighted to weighted graphs

# Hierarchy Coordinates Linear Thresholds, Colored by Selectivity

Uniform Random

$\langle k \rangle = n/2$

$\langle k \rangle = n/4$

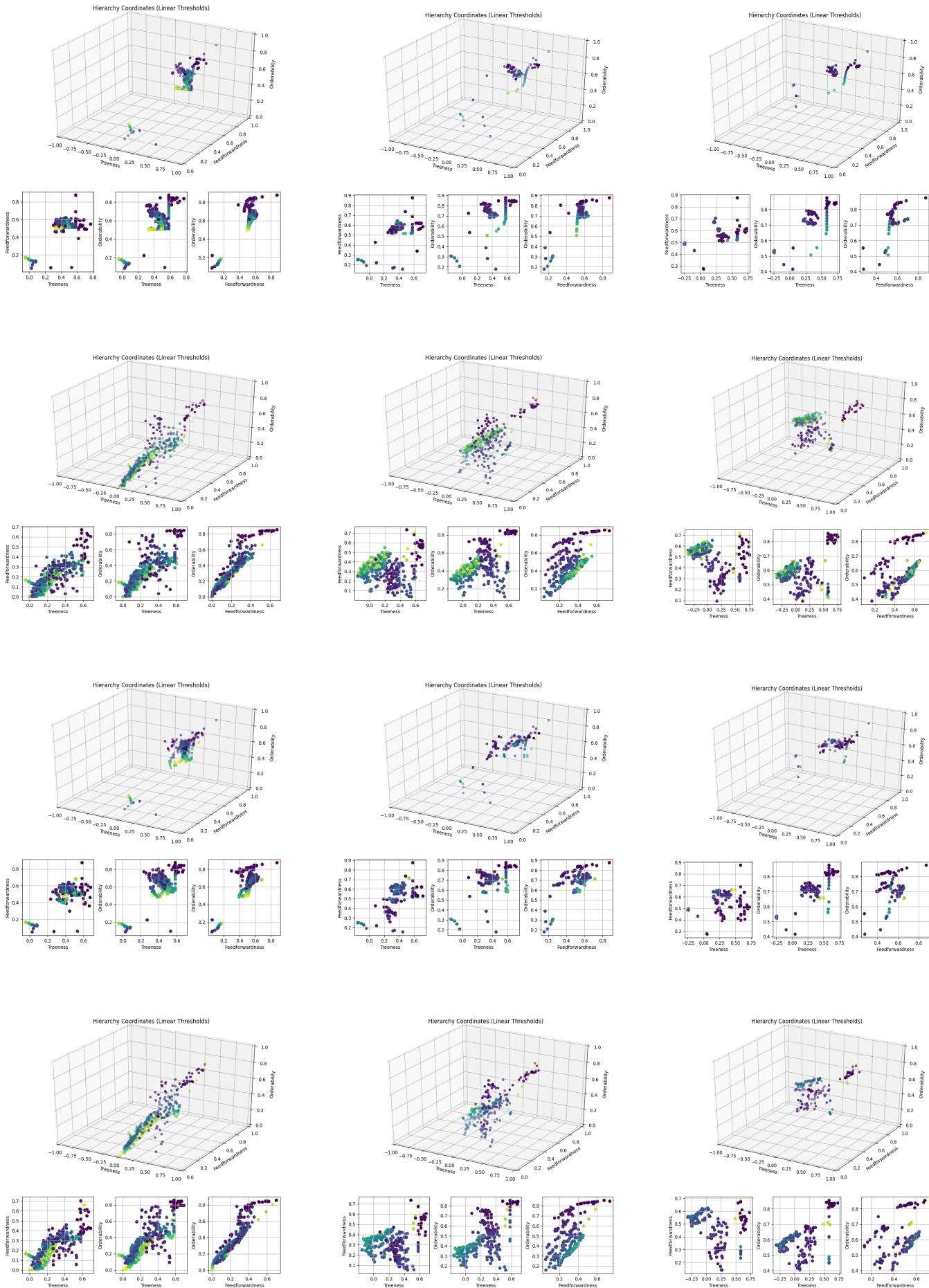
Seeding Methodology

10 Shifts

Constant Seeding

Random Seeding

Power Law,  $\alpha = 5$



# Hierarchy Coordinates Linear Thresholds, Colored by Edge Conservation

Uniform Random

$\langle k \rangle = n/2$

$\langle k \rangle = n/4$

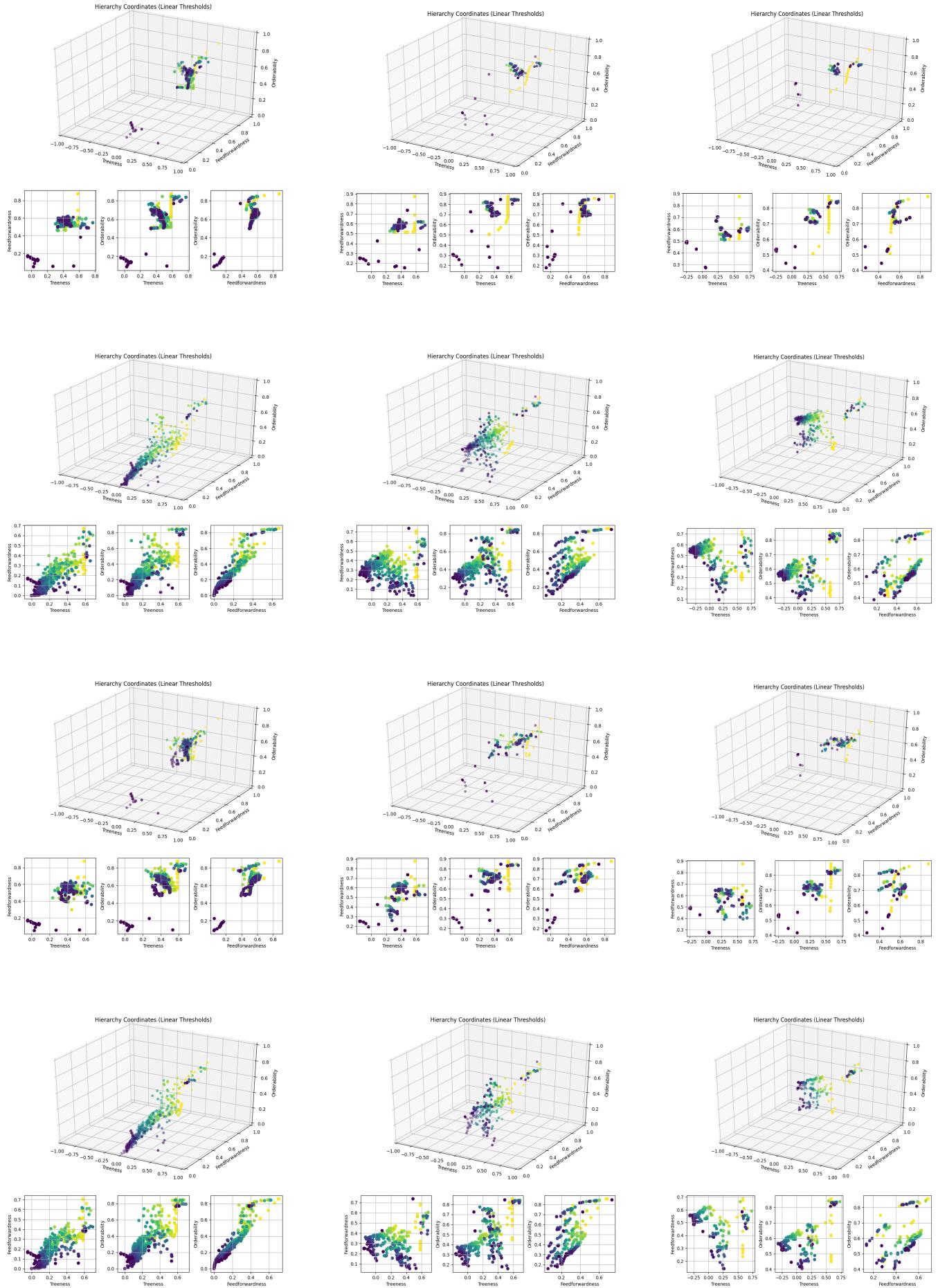
Seeding Methodology

10 Shifts

Power Law,  $\alpha = 5$

Random Seeding

Constant Seeding



# Hierarchy Coordinates Exponential Thresholds, Colored by Selectivity

Uniform Random

$\langle k \rangle = n/2$

$\langle k \rangle = n/4$

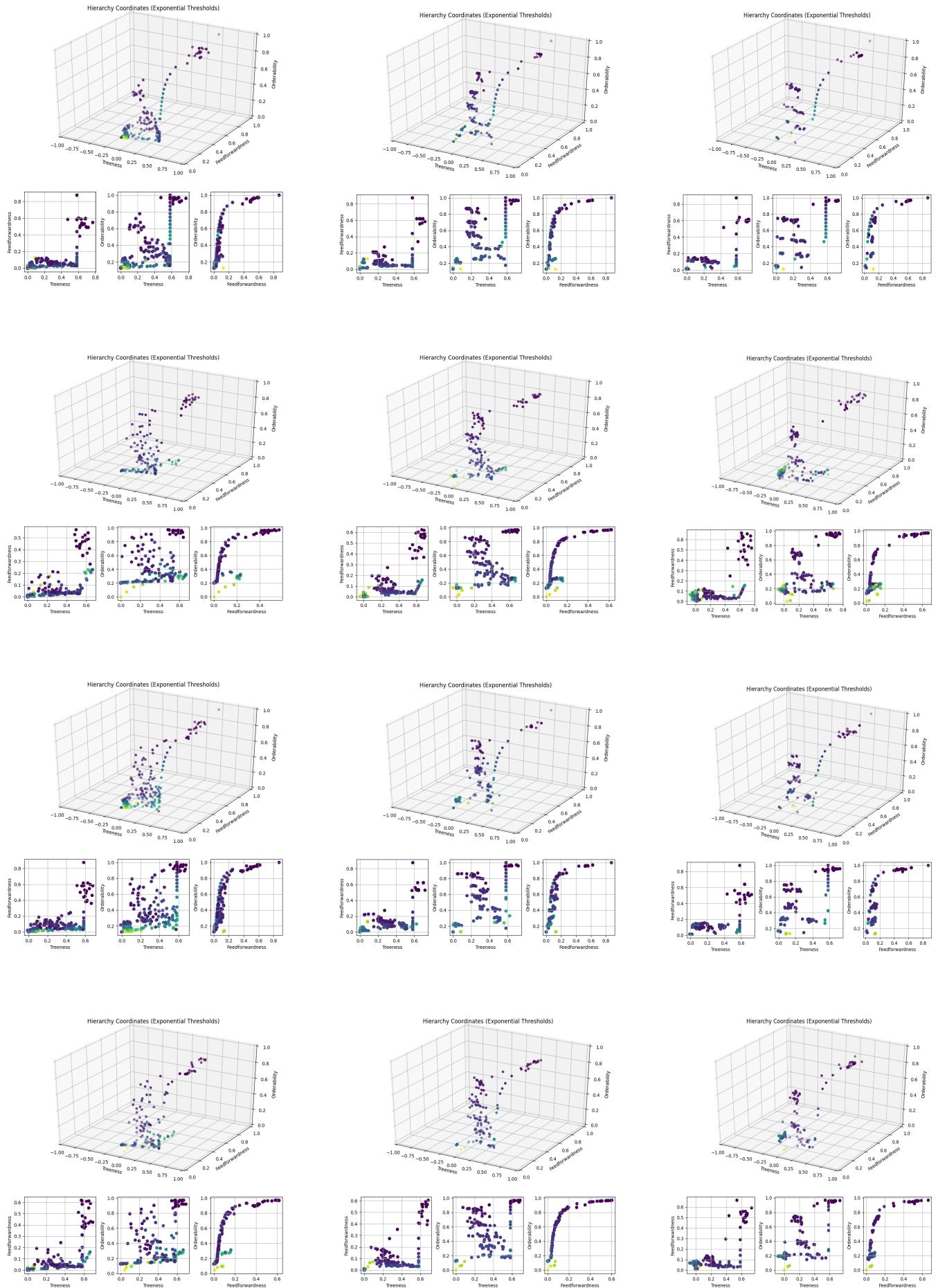
Seeding Methodology

10 Shifts

Random Seeding

Constant Seeding

Power Law,  $\alpha = 5$



# Hierarchy Coordinates

## Exponential Thresholds, Colored by Edge Conservation

### Uniform Random

$\langle k \rangle = n/2$

$\langle k \rangle = n/4$

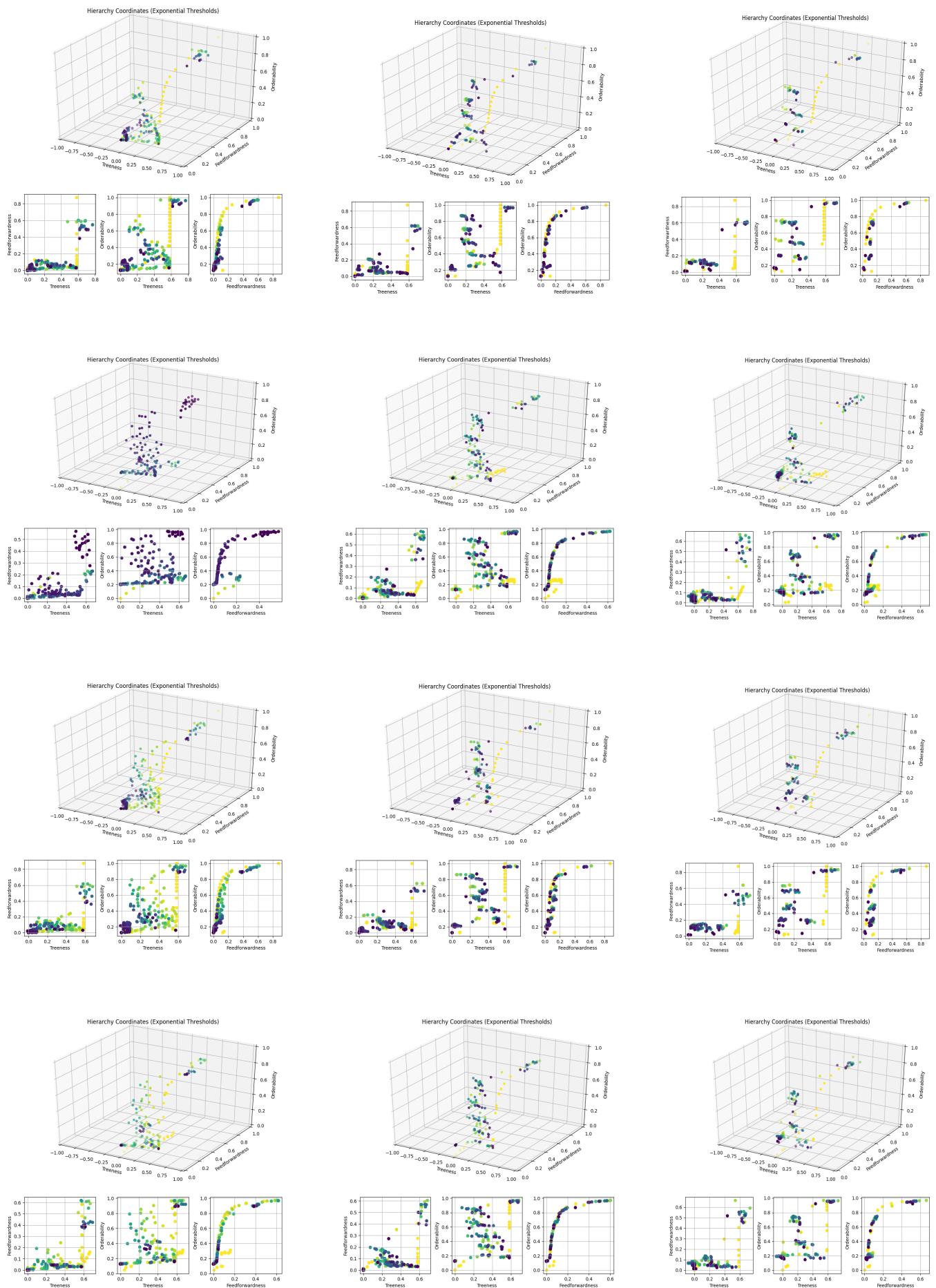
Seeding Methodology

10 Shifts

Constant Seeding

Random Seeding

Power Law,  $\alpha = 5$



# Efficiency Coordinates

# Complete Efficiency Morphospace Colored By Selectivity

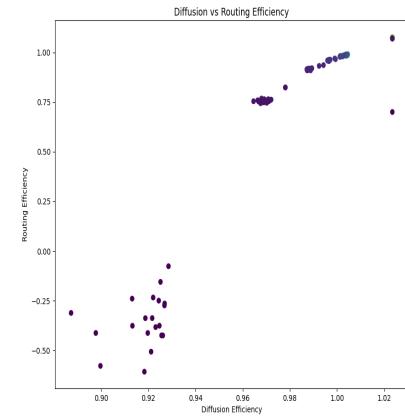
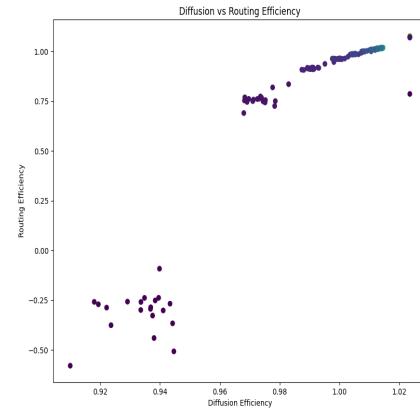
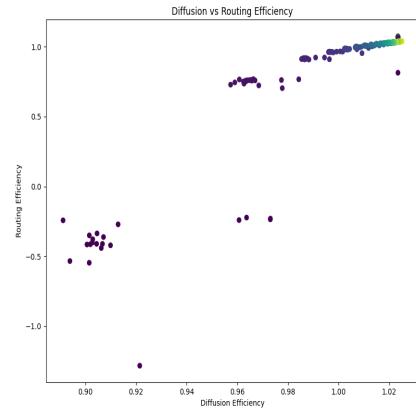
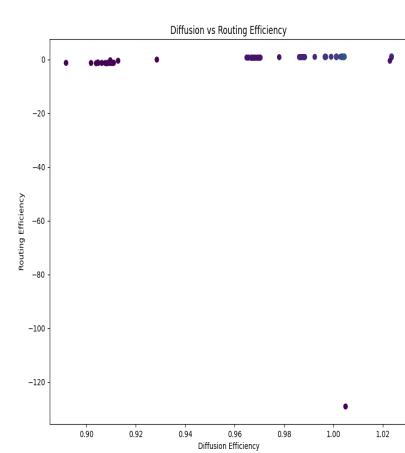
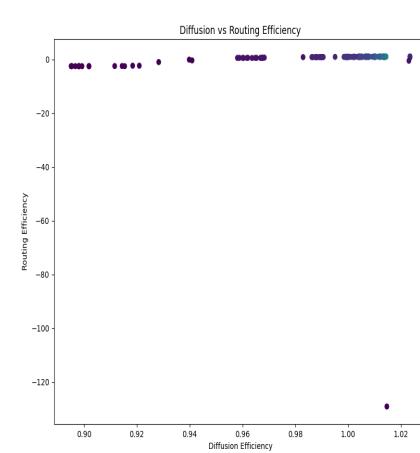
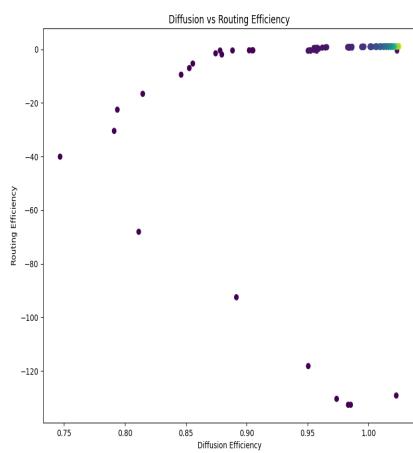
Uniform Random

$\langle k \rangle = n/2$

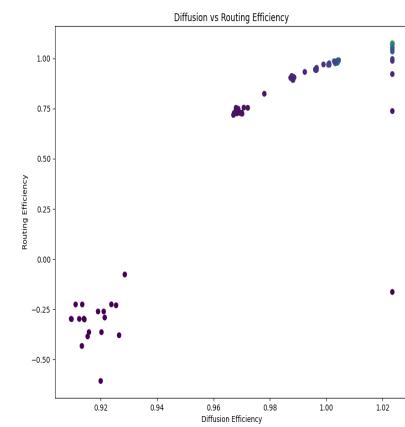
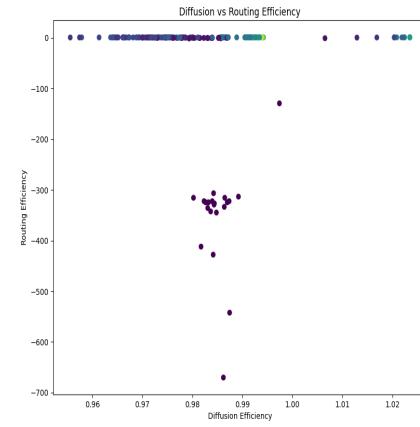
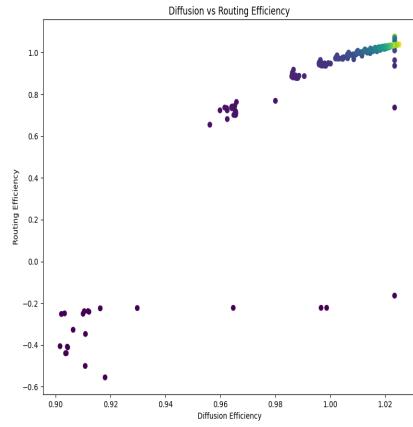
$\langle k \rangle = n/4$

Seeding Methodology

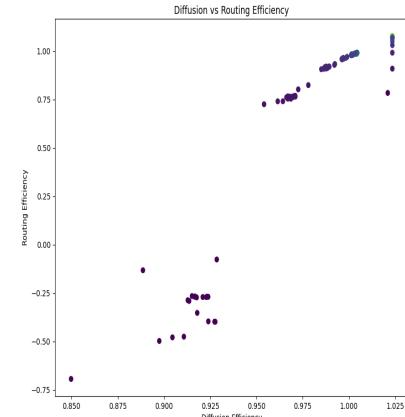
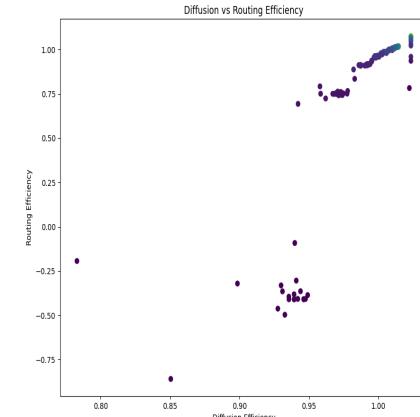
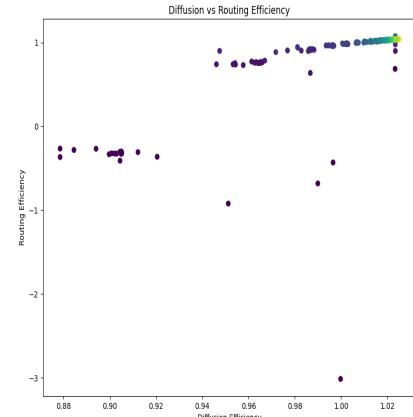
Constant Seeding



10 Shifts



Power Law,  $\alpha = 5$



# Efficiency Morphospace (Around 1, 1) Colored By Selectivity

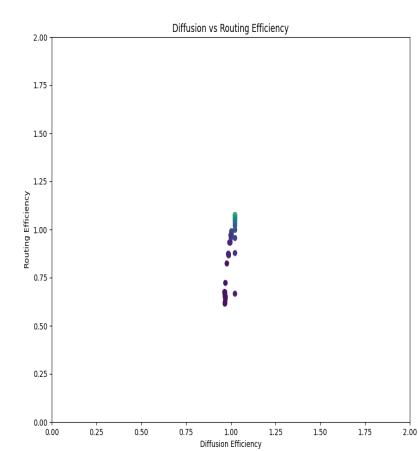
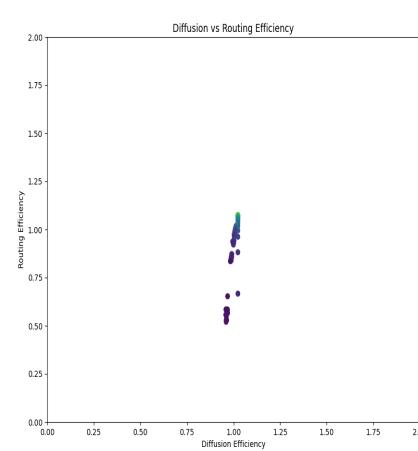
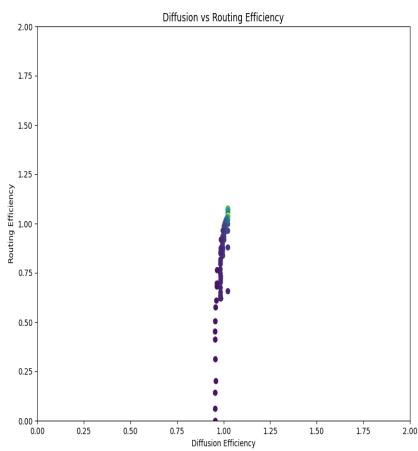
Uniform Random

$\langle k \rangle = n/2$

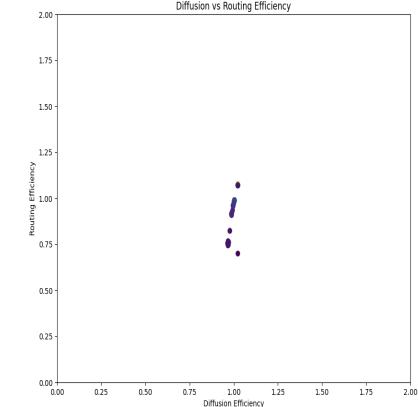
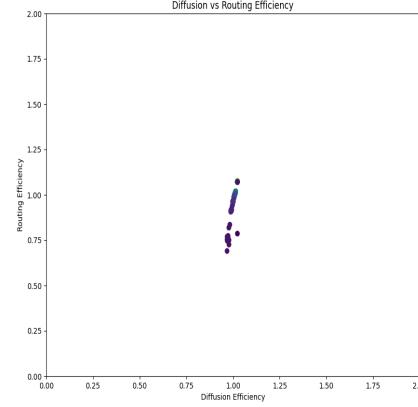
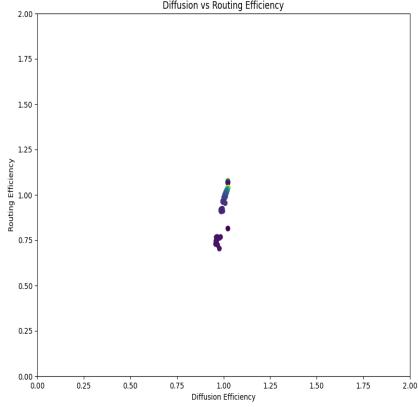
$\langle k \rangle = n/4$

Seeding Methodology

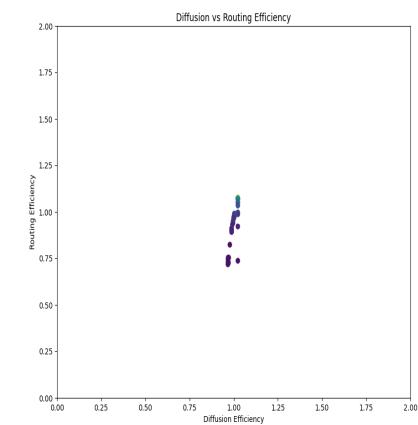
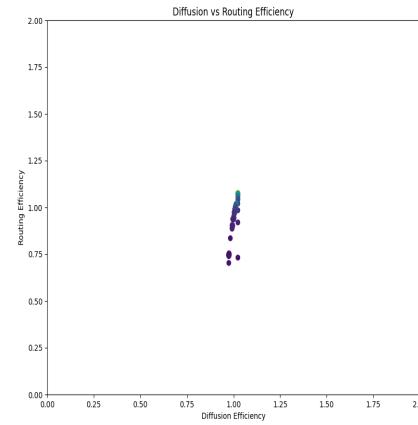
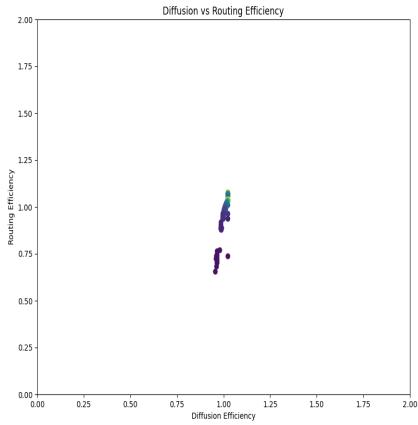
Constant Seeding



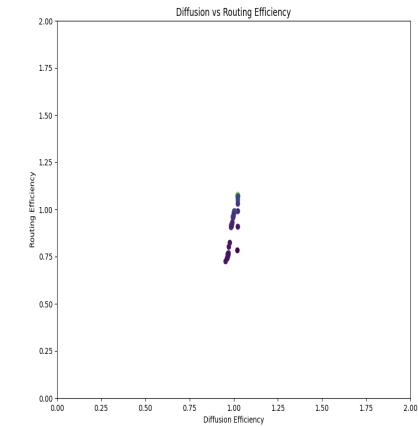
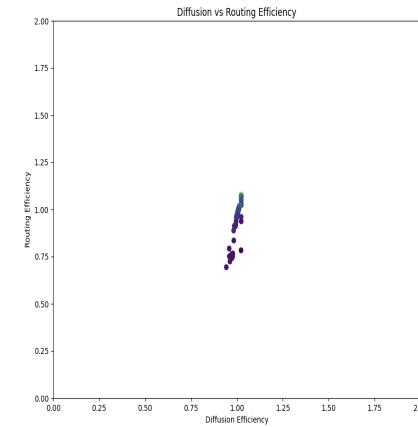
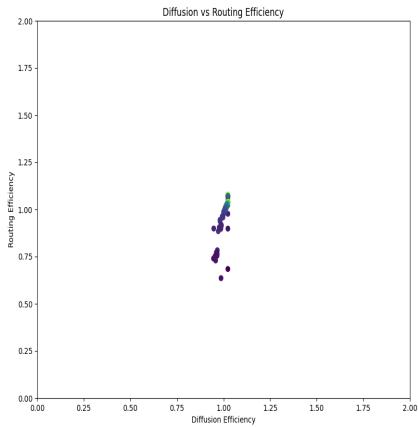
Random Seeding



10 Shifts



Power Law,  $\alpha = 5$



# Efficiency Morphospace (outliers minimized; variable space)

Colored Via Selectivity

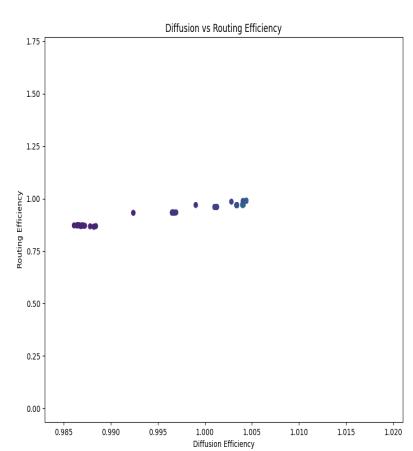
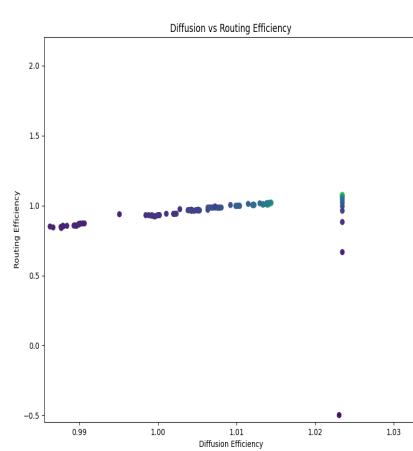
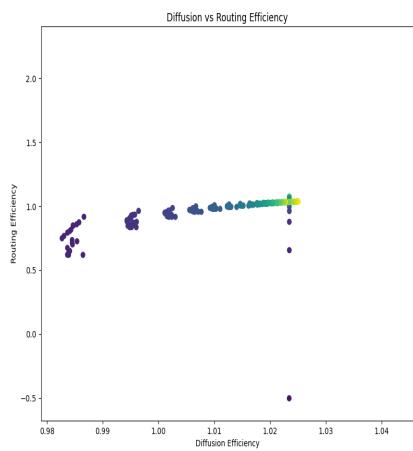
Uniform Random

$\langle k \rangle = n/2$

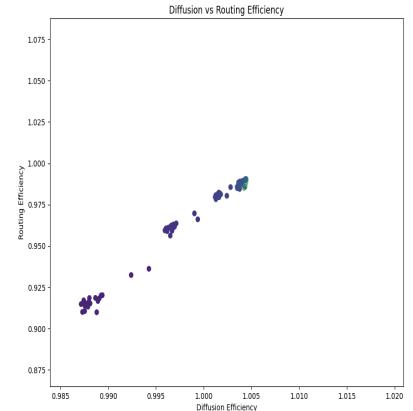
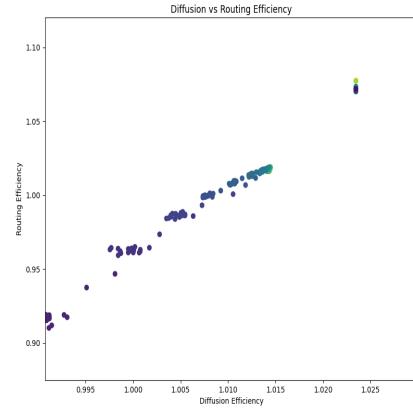
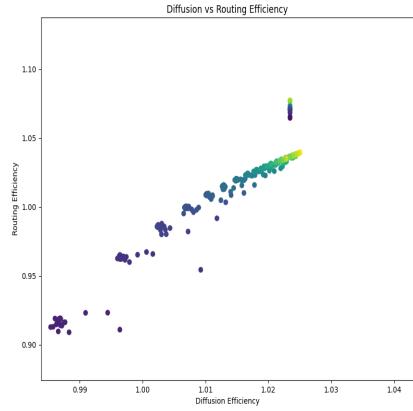
$\langle k \rangle = n/4$

Seeding Methodology

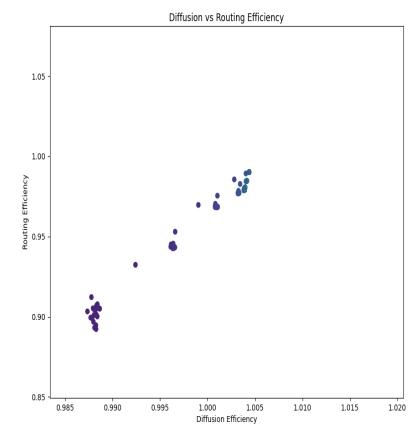
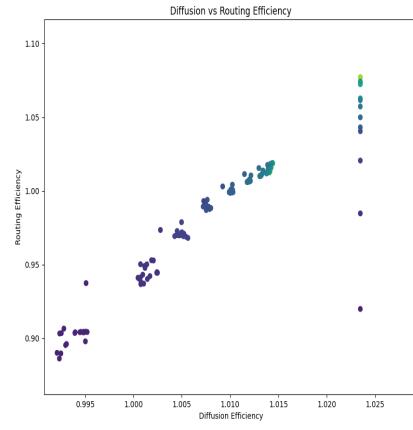
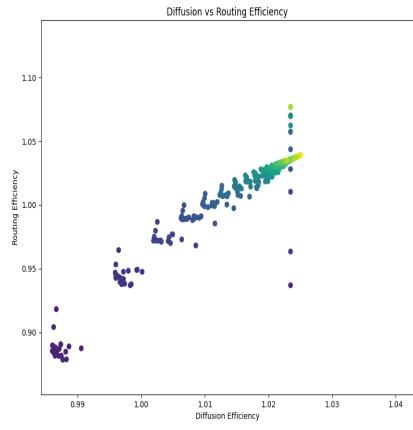
Constant Seeding



Random Seeding



10 Shifts



Power Law,  $\alpha = 5$

