



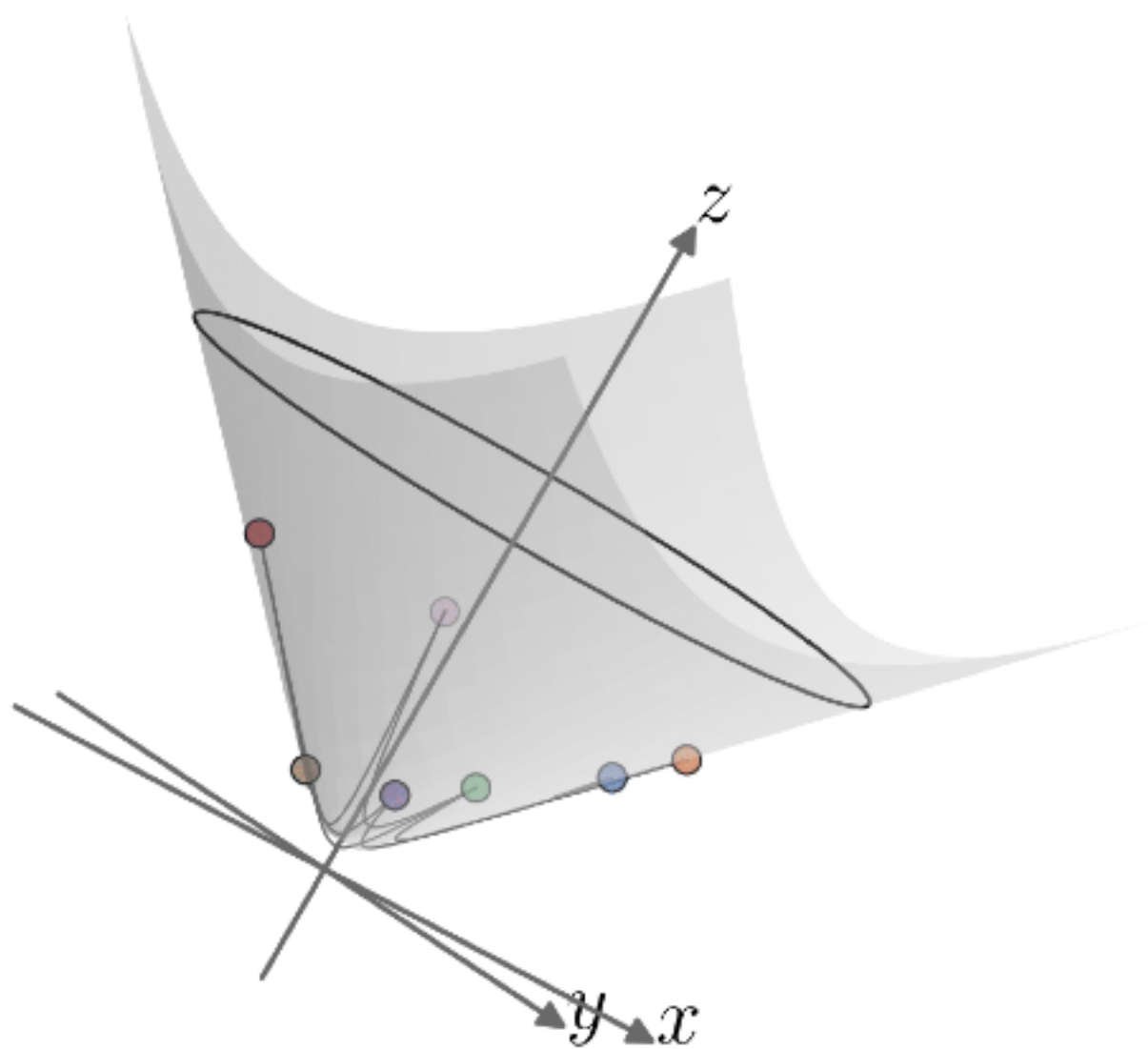
# Outline

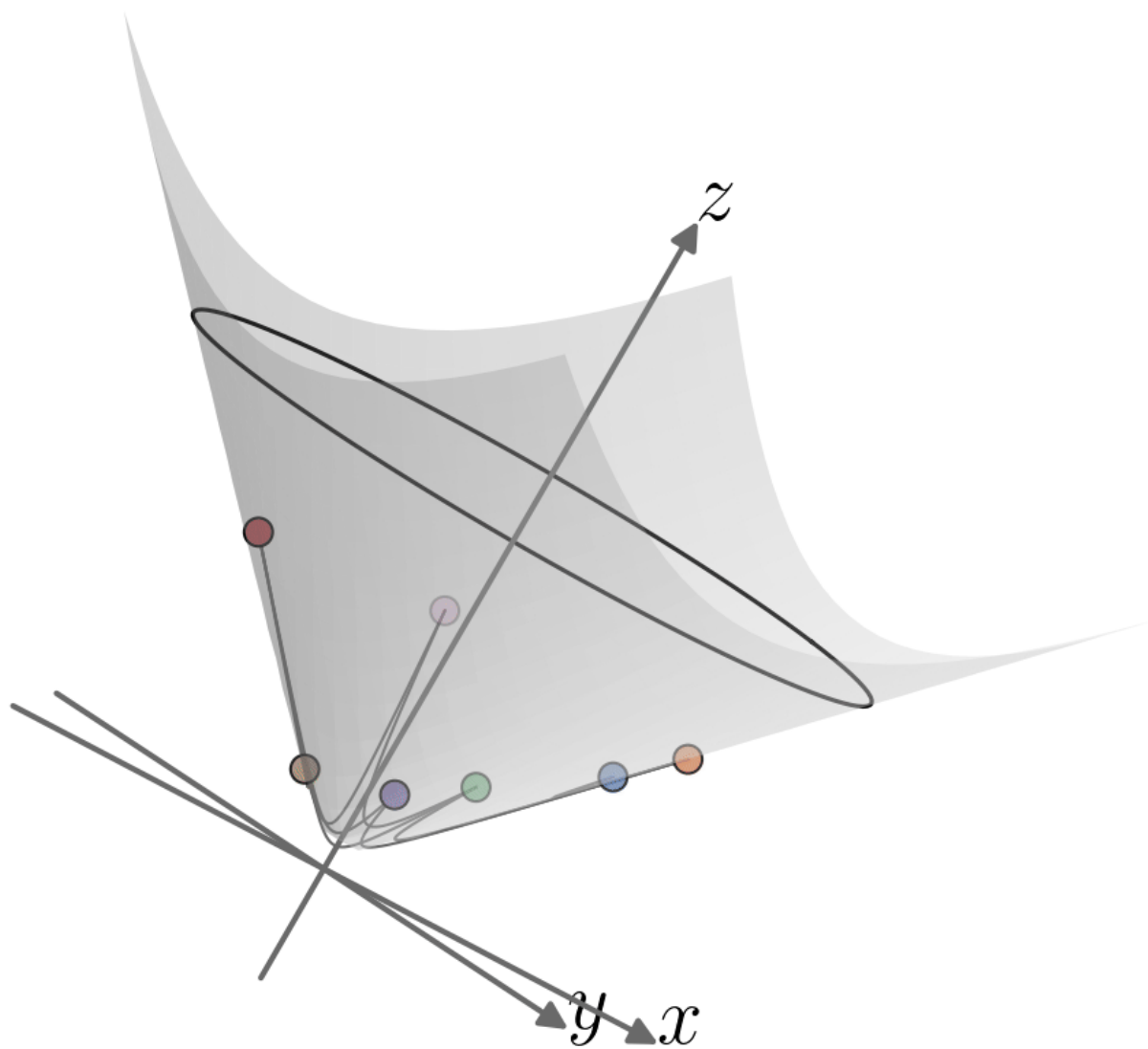
1. Are simple models enough to study complex systems/networks?

**2. “Simple” ways to encode structural complexity**

**(a) latent metric space**

(b) stub types





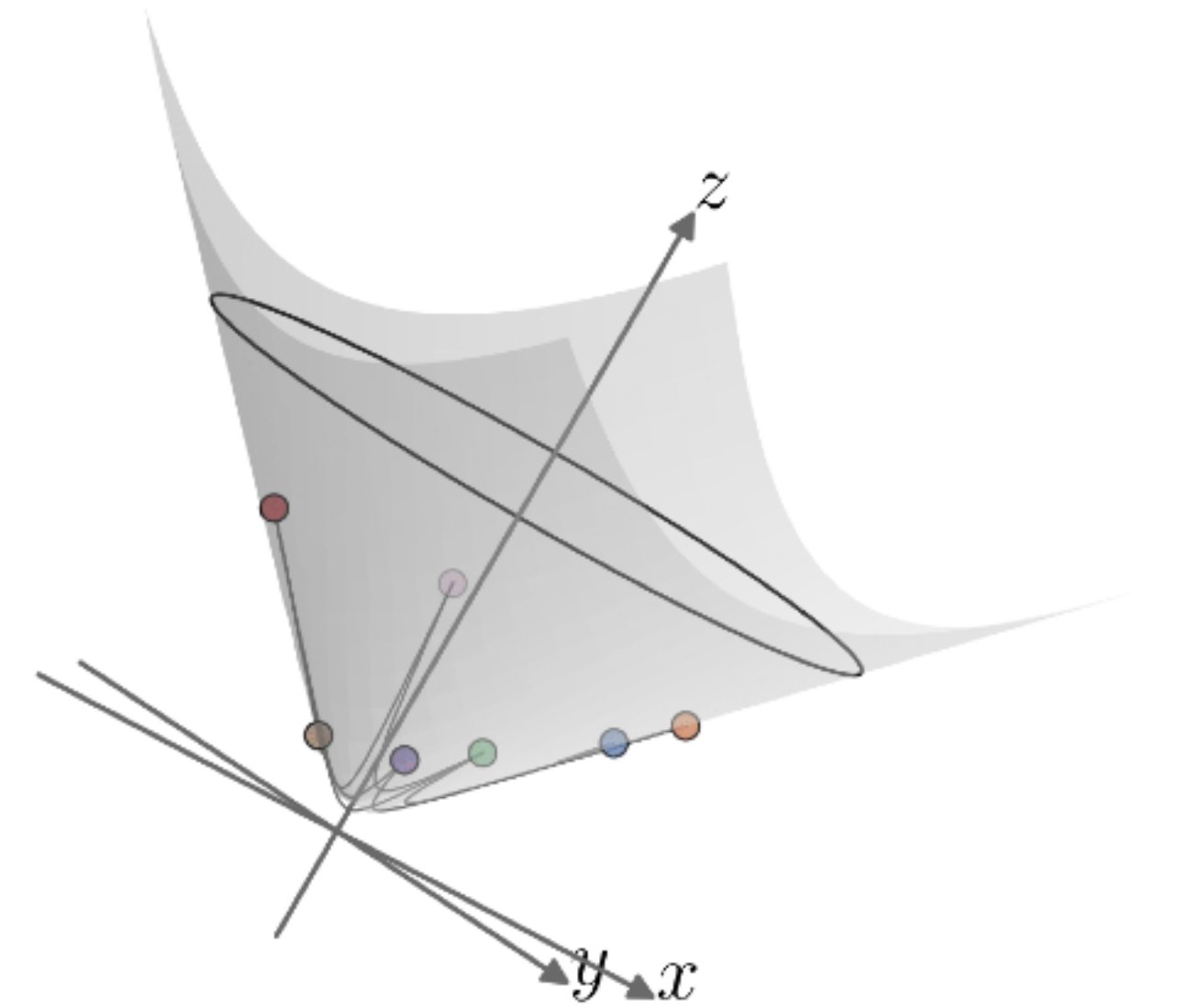
# Outline

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## 2. “Simple” ways to encode structural complexity

(a) latent metric space

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# Maximally random graph ensembles

The **probability**,  $P(\mathbb{A})$ , for a  $N \times N$  adjacency matrix  $\mathbb{A} = \{a_{ij}\} \in [0, 1]^{\binom{N}{2}}$  that maximizes the **entropy** subjected to the  $L$  **constraints** ( $l = 1, 2, \dots, L$ )

$$S(\{\mathbb{A}\}) = - \sum_{\mathbb{A}} P(\mathbb{A}) \ln P(\mathbb{A}) \quad \bar{F}_l = \sum_{\mathbb{A}} F_l(\mathbb{A}) P(\mathbb{A})$$

is ( $\alpha_l$  being the  $l$ -th Lagrange multiplier)

$$P(\mathbb{A}) \propto \exp \left( - \sum_{l=1}^L \alpha_l F_l(\mathbb{A}) \right) .$$