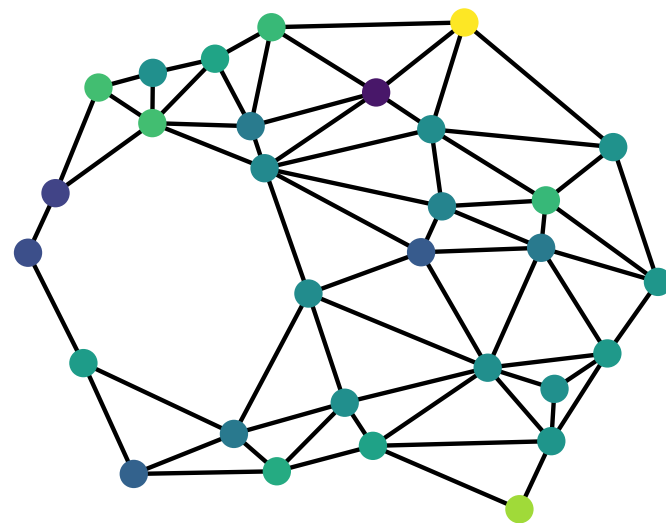


# 4. Topological Schrödinger Bridge Matching

- matching topological signal distributions
- generative learning of topological signals

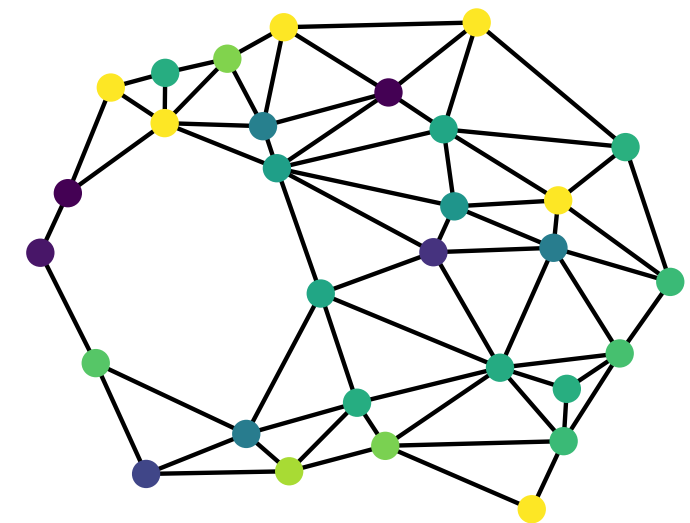
# Topological signal distribution matching

- In a topological domain, e.g., a graph, signals on the node set.
- Given (empirical) signal distributions,  $X_0 \sim \rho_0$  at  $t = 0$  and  $X_1 \sim \rho_1$  at  $t = 1$



(unknown) stochastic process

$$X := (X_t)_{0 \leq t \leq 1} \sim \mathbb{P}$$



- Assume some prior (reference) process  $Y \sim \mathbb{Q}_{\mathcal{T}}$  — — topology-aware

**Topological Schrödinger Bridge Problem**

$$\min D_{KL}(\mathbb{P} \parallel \mathbb{Q}_{\mathcal{T}}) \text{ s.t. } \mathbb{P}_0 = \rho_0, \mathbb{P}_1 = \rho_1$$