Statistical Connectomics: Homework 2

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Review of 6 Steps

1. Sample Space: Ξ
2. Model: $P = \{P_\theta : \theta \in \Theta\}$
3. Action Space: $\mathcal{A} = \{a_1, ...\}$
4. Decision Rule Class: $\Phi = \{\Xi \to \mathcal{A}\}$
5. Loss Function: $l : P \times \mathcal{A} \to \mathbb{R}_+$
6. Risk Functional: $R : \mathcal{L} \times \Phi \times P \to \mathbb{R}_+$

Example

0.1 Sample Space

$$\mathcal{G}_n = (\mathcal{V}, \mathcal{E}, \mathcal{Y})$$

$$\mathcal{V} = \{v_1, ..., v - n\}$$

$$\mathcal{E} = \{e_{11}, ..., e_{nn}\}$$

$$\mathcal{Y} = \{0, 1\}^n$$

0.2 Model

$$SBM_n^K(\vec{\rho}, \vec{\beta}),\ \vec{\rho} \in \Delta_2,\ \vec{\beta} \in (0, 1)^{2\times 2}$$

0.3 Action Space

$$\mathcal{A} = \{y \in (0, 1)^n\}$$

0.4 Loss Function

$$l : \mathcal{G}_n \times \mathcal{A} \to \mathbb{R}_+$$

$$l : \sum_{i=1}^{n} \mathbb{I}\{\hat{y}_i = y_i\}$$

0.5 Risk Functional

$$R : P \times l \to \mathbb{R}_+$$