Static GRN Models

\[ X_1 = f(X_2, X_3, \ldots, p_{11}, p_{12}, \ldots) \]

Dynamic GRN Models (reference models)

\[ \dot{X}_1 = f(X_1, X_2, \ldots, p_{11}, p_{12}, \ldots) \]

\[ \dot{X}_2 = f(X_1, X_2, \ldots, p_{21}, p_{22}, \ldots) \]

\[ \vdots \]

Dynamic data

Data from yeast biological network (Cantone et al. 2009)

execute/simulate models

Step 1

Step 2

Step 3

Step 4

Step 5

Static GRN Models

Dynamic GRN Models

construct manually

construct from literature

Dynamic data

reverse-engineer models

Dynamic GRN Models

Dynamic GRN Models

\[ \dot{X}_1 = f(X_1, X_2, \ldots, p_{11}, p_{12}, \ldots) \]

\[ \dot{X}_2 = f(X_1, X_2, \ldots, p_{21}, p_{22}, \ldots) \]

\[ \vdots \]

Predictive power on training data, \( P_{\text{ver}} \)

Inferential power, \( P_{\text{inf}} \)

(model parameters)

Qualitative evaluation (GRN features)

Predictive power on unseen data, \( P_{\text{val}} \)

verify models

validate models

Dynamic data

Data from yeast biological network (Cantone et al. 2009)

execute/simulate models

Dynamic GRN Models

construct manually

Dynamic GRN Models

Dynamic GRN Models

\[ \dot{X}_1 = f(X_1, X_2, \ldots, p_{11}, p_{12}, \ldots) \]

\[ \dot{X}_2 = f(X_1, X_2, \ldots, p_{21}, p_{22}, \ldots) \]

\[ \vdots \]