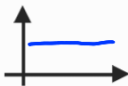
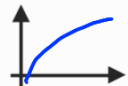
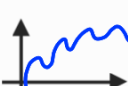
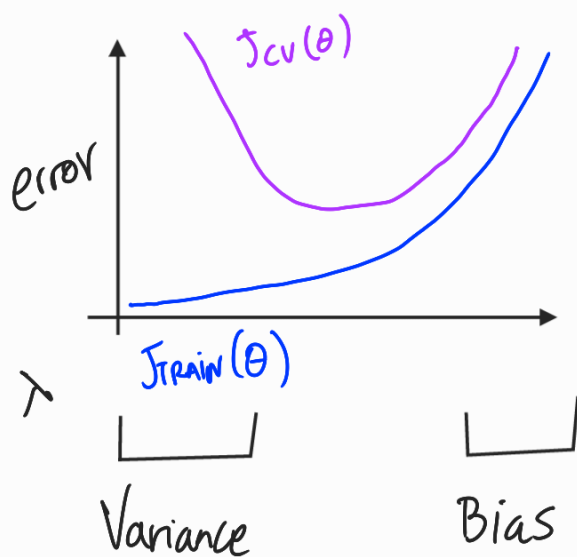


Error	Train-test	Cross validation
Bias (under)	↑	↑
Variance (over)	↑	↓

With regularization ($\frac{\lambda}{2m} \sum_{j=1}^m \theta_j^2$):

- High $\lambda \Rightarrow$ underfit  $h_\theta(x) \approx \theta_0$
- Medium $\lambda \Rightarrow$ right 
- Small $\lambda \Rightarrow$ overfit  $h_\theta(x) \approx h_\theta(x)$



Error	Train-test	Cross validation
Bias	↑	↑
Variance	↓	↑

Fix

- Underfitting
 - Additional features
 - Add polynomial features
 - Decrease λ
- Overfitting
 - More training examples
 - Smaller set of features
 - Increase λ

Learning curves: detecting bias / variance

Select a little part of training set.

