Bias Variance Tradeoff
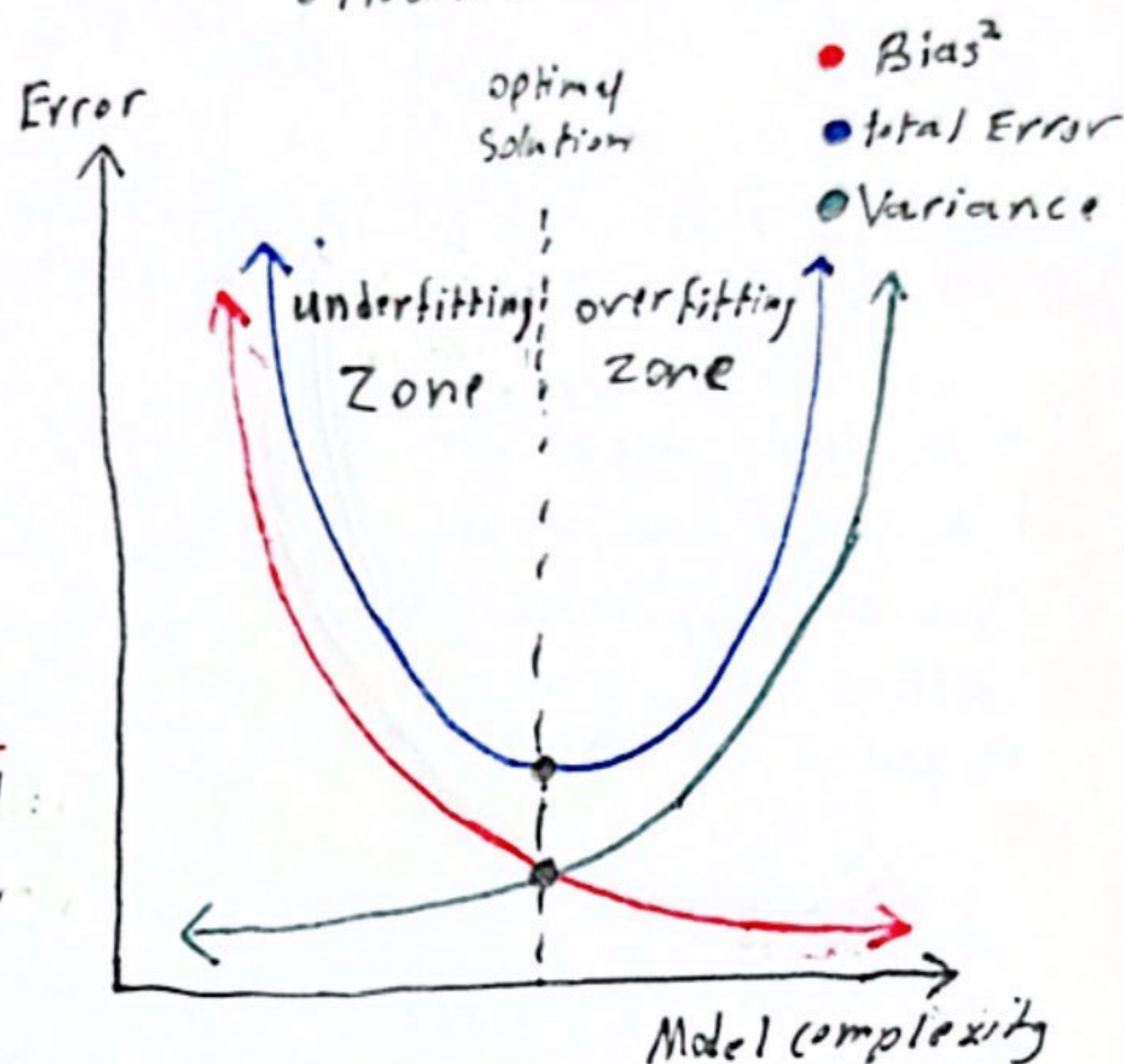
- a concept in ML that Describes the struggle of a Models ability to minimize bias and variance at the same time. Usually Reducing one increses the other. as Model complexity increse Bias Decreses as the model can capture more complex patterns. Variance increses as the model becomes more sensitive to changes in training data. Bias increses as model complexity decreses. Variance decreses as model becomes more stable. we want optimal sol good at finding patterns and not fitting (learning) from noies.

- TradeOff Chart

Error

optimal Solution

- Bias²
- total Error
- Variance

underfitting Zone ¦ overfitting Zone

Model complexity

Noise

- refers to random variations and Errors in data that dont represent true patterns in data, like random fluctuations in sensor reading for ex. or errors in data collection

we want to find the true patterns while ignoring noise. noise is whats left over after perfect fitting of the data which a perfect model capturing all the signal in data

true pattern

y

x

Noise → ignore