Foundations of Machine Learning AI2000 and AI5000

FoML-07
Geometrical Interpretation of Linear Regression (least squares)

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భారతీయ సాంకేతిక విజ్ఞాన సంస్థ హైదరాబాద్
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So far in FoML

- What is ML and the learning paradigms
- Probability refresher
- MLE, MAP, and fully Bayesian treatment
- Linear Regression with basis functions

Geometrical Interpretation of Least Squares

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Geometry of Least Squares

- Consider an N-dim space
- Axes are given by t_n (n = 1, 2, ... N)

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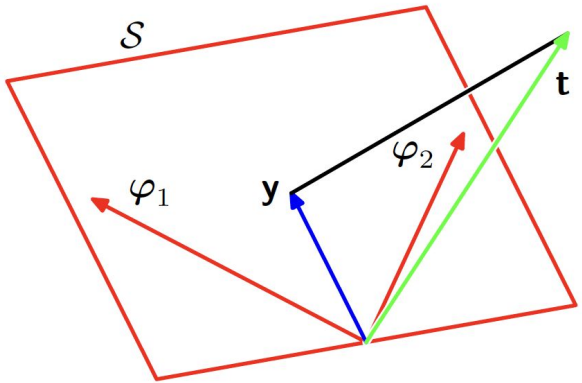
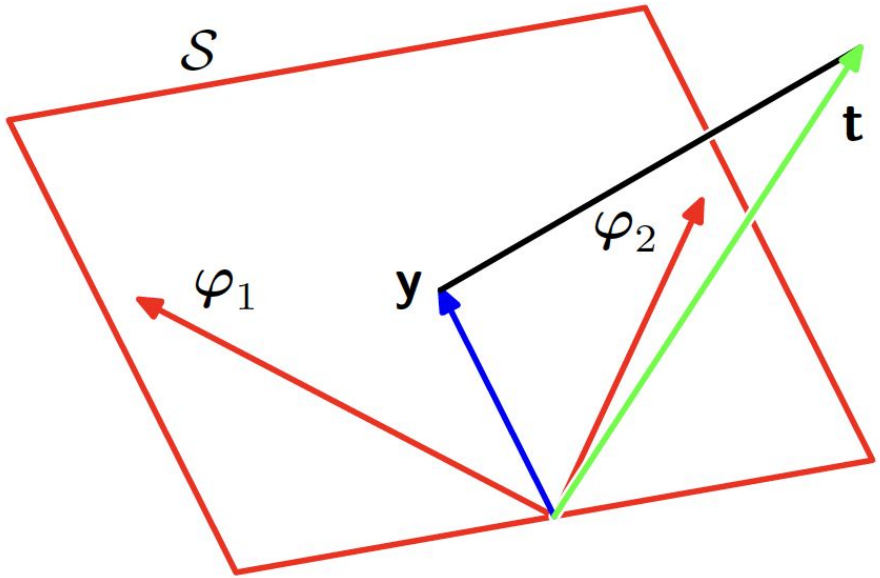
- Axes are given by t_n (n = 1, 2, ... N)
- $\mathbf{t} = (t_1, t_2, ..., t_N)$ becomes a vector in that space

Geometry of Least Squares

- Values of each basis function ϕ_j is a vector
  - Evaluated at all the training data



Geometry of Least Squares



Geometry of Least Squares

- Solution for w corresponds to the choice of prediction (y) that is the orthogonal projection of **t** (vector of targets) onto the subspace spanned by the basis functions

Rough work