E9 205 Machine Learning for Signal Processing

Probabilistic PCA and Non-linear Regression

24-09-2018

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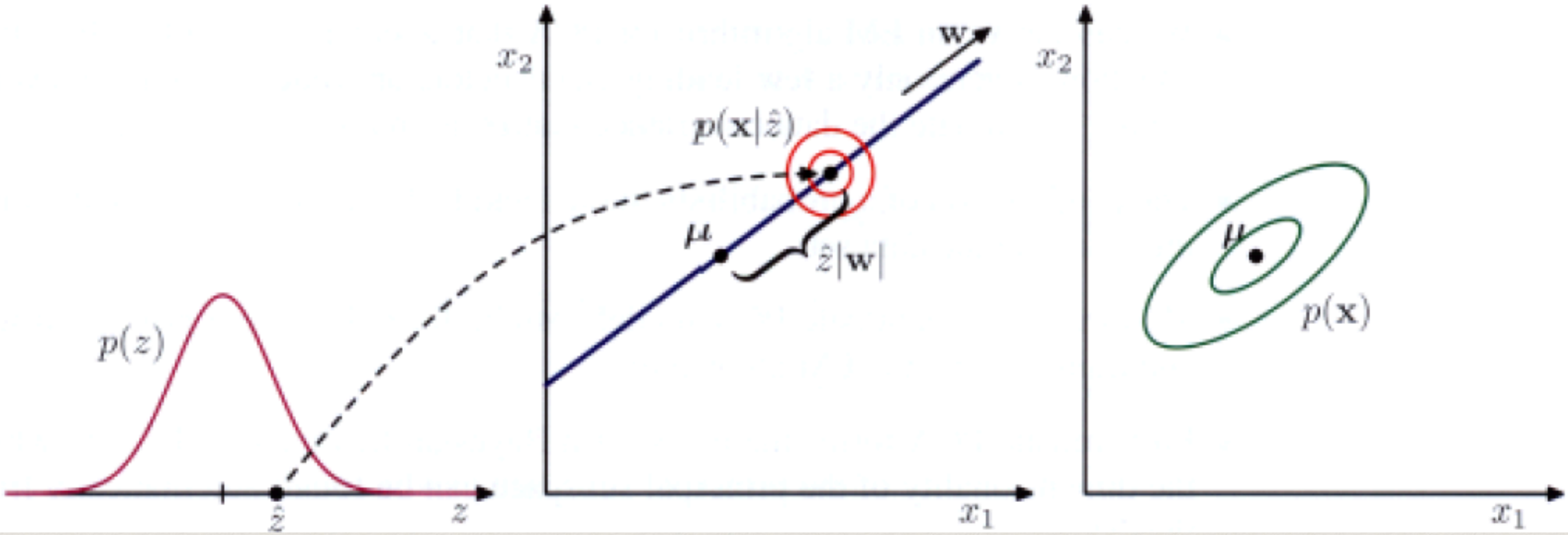
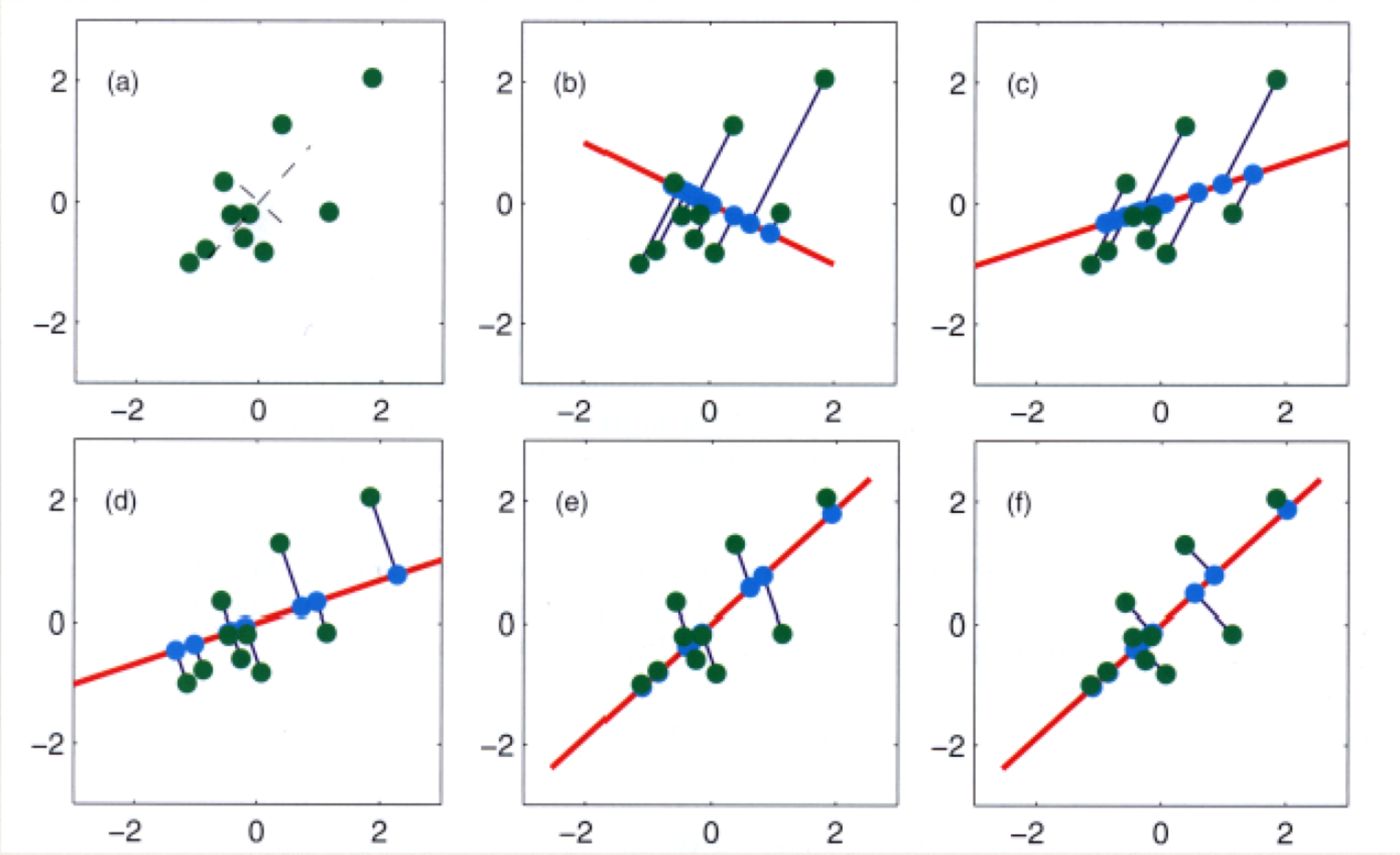
Probabilistic PCA



$$p(\mathbf{x}|\mathbf{z}) = \mathcal{N}(\mathbf{x}|\mathbf{W}\mathbf{z} + \boldsymbol{\mu}, \sigma^2\mathbf{I})$$

$$p(\mathbf{z}) = \mathcal{N}(\mathbf{z}|\mathbf{0}, \mathbf{I}).$$

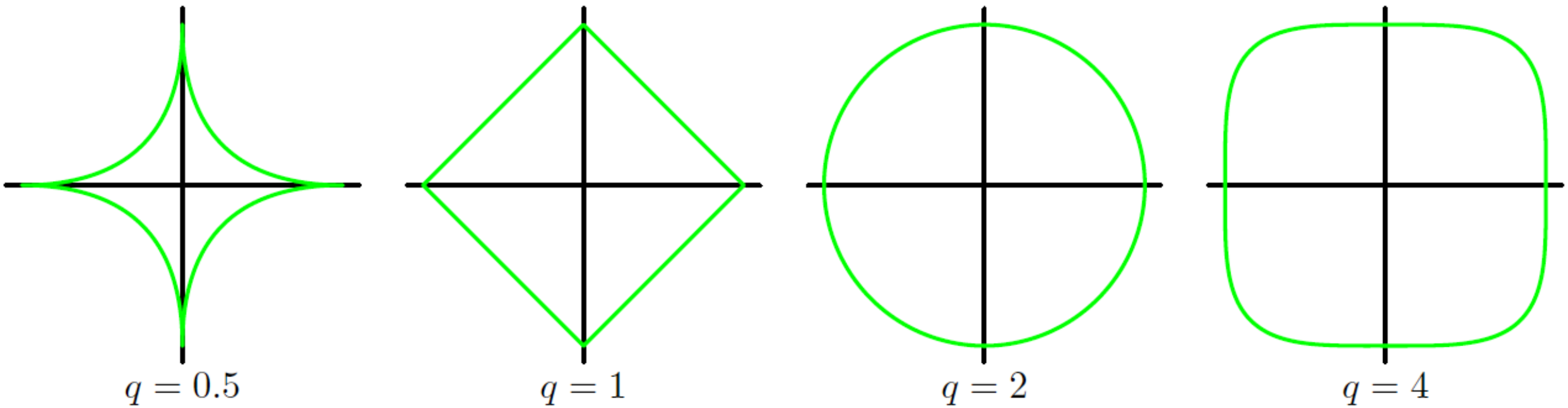
Probabilistic PCA - EM Algorithm



Probabilistic PCA

- Missing Data Problems
- Probabilistic Interpretation of PCA
- Useful for Classification

Regularization in Least Squares



$$\frac{1}{2}\sum_{n=1}^{N}\{t_n - \mathbf{w}^{\mathrm{T}}\boldsymbol{\phi}(\mathbf{x}_n)\}^2 + \frac{\lambda}{2}\sum_{j=1}^{M}|w_j|^q$$

Regularization in Least Squares