LMMSE vs MMSE

- Suppose we wish to estimate $\mathbf{x}$ from $\mathbf{y}$.

LMMSE objective

Find $\mathbf{A}$ and $\mathbf{b}$ such that

$$\hat{\mathbf{x}}(\mathbf{y}) = \mathbf{A}\mathbf{y} + \mathbf{b}$$

yields the smallest possible MSE,

$$\mathbb{E}\{(\mathbf{x} - \hat{\mathbf{x}})^T(\mathbf{x} - \hat{\mathbf{x}})\}$$

.

MMSE objective

Find $\hat{\mathbf{x}}(\mathbf{y})$ that minimizes

$$\mathbb{E}\{(\mathbf{x} - \hat{\mathbf{x}}(\mathbf{y}))^T(\mathbf{x} - \hat{\mathbf{x}}(\mathbf{y}))\big|\mathbf{y}\}.$$

We know that the MMSE estimator is

$$\hat{\mathbf{x}}(\mathbf{y}) = \mathbb{E}\{\mathbf{x}\big|\mathbf{y}\}.$$

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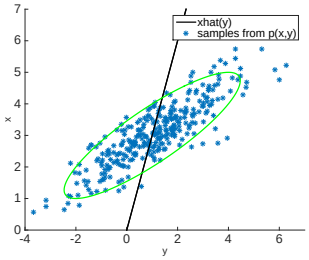

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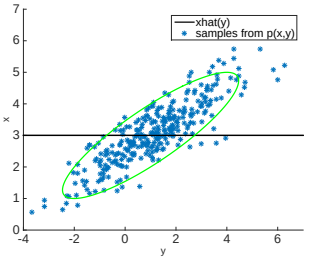

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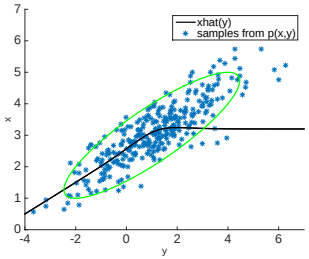

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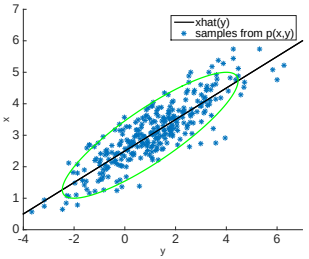

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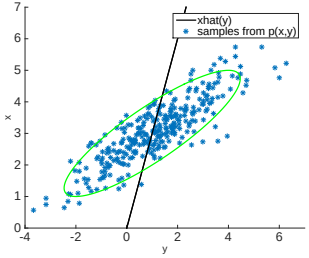

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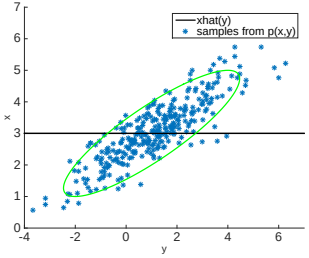

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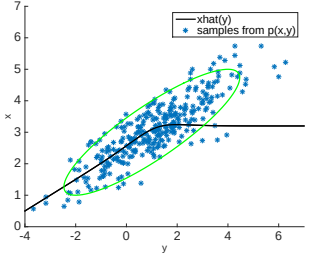

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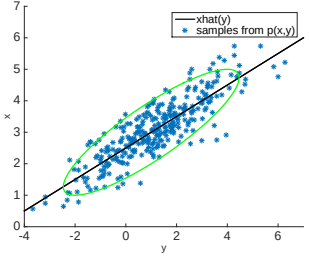

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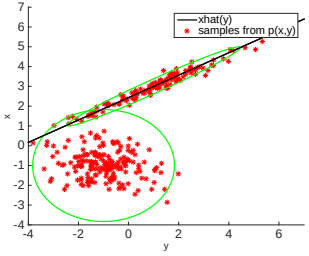

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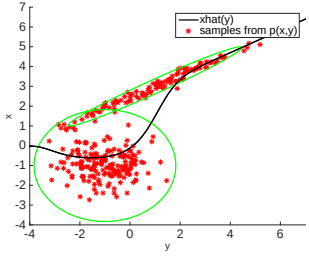

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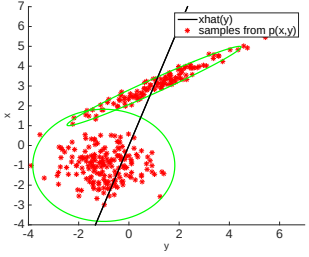

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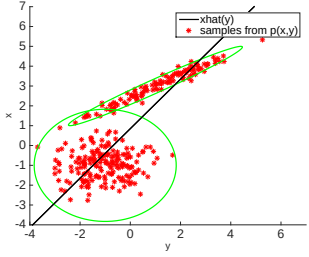

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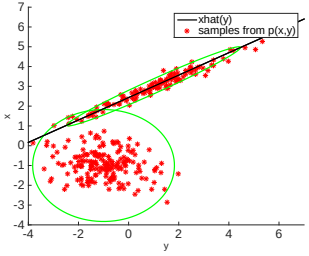

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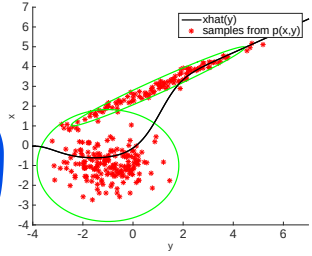

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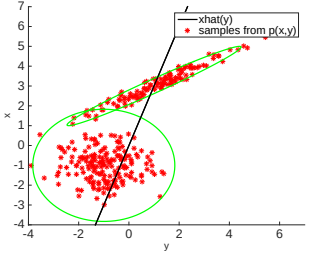

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