

# CSE 6740 A/ISyE 6740: Computational Data Analysis: Introductory lecture

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# Last time

- ▶ Least squares regression

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- ▶ Gauss-Markov theorem

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- ▶ Ridge regression, optimization and geometric perspectives

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- ▶ Shrinkage

# Today

- ▶ Shrinkage by ridge regression

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- ▶ Shrinkage by ridge regression
- ▶ Geometric view of LASSO

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- ▶ Geometric view of LASSO
- ▶ Generalization of LASSO



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- ▶ Generalization of LASSO
- ▶  $\ell^0$  regularization and compressed sensing

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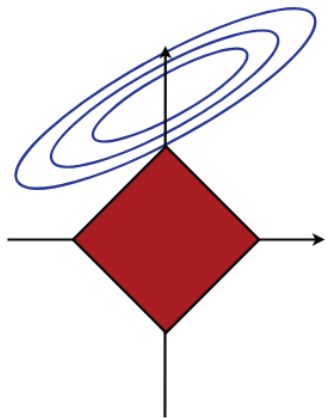
- ▶ Online linear regression algorithms

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- ▶ Classification ERM

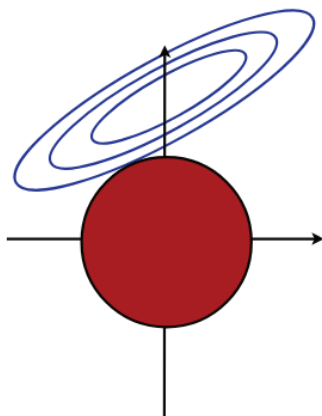
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- ▶ Perceptron algorithm
- ▶ Convergence proof of perceptron algorithm

# Compression by LASSO



L1 regularization



L2 regularization