

HONORS THESIS
DEFENSE

*Gradient Descent Methods for Large-Scale Linear Inverse
Problems*

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Abstract: Iterative gradient descent methods are frequently used for ill-posed inverse problems because they are suitable for large models and they are cheap to work with. In this thesis, we explore three different types of gradient descent methods: the Landweber method, method of steepest descent, and the Barzilai-Borwein method. Specifically, we also compare the efficiency of these methods to the conjugate gradient method. The thesis begins with an introduction to the history and application of the gradient descent methods and to the methods tested, and follows with convergence analysis and numerical experience on real images. Ways to accelerate and smooth the BB method are also included.

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