

Fall 2016

Mathematical Sciences

Colloquium

“Fast Alternating Direction Algorithms for Nonsmooth, Convex/Nonconvex Optimization with Imaging Applications”

Abstract:

In this talk, I propose several efficient, reliable, and practical computational algorithms to solve challenging optimization problems arising in medical imaging and image processing. These problems are non-differentiable, and ill-conditioned, non-convex, and /or highly nonlinear, that traditional sub-gradient based methods converge very slowly. To tackle the computational complexities, I use relaxation and approximation techniques. In addition, I exploit splitting variables and alternating direction method of multipliers to decouple the original challenging problems into subproblems which are easier to solve. To obtain fast results, I develop innovative line search strategies and solve the subproblems by Fourier transforms and shrinkage operators. I present the analytical properties of these algorithms as well as various numerical experiments on parallel Magnetic Resonance imaging, image inpainting, and image colorization. The comparison with some existing state-of-art methods are given to show the efficiency and the effectiveness of the proposed methods.

Dr. Maryam Yashtini

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Monday, November 21, 2016

4:00-5:00pm

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