Core sets in optimization: a unifying framework

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Recently, many studies have centered around developing algorithms for large-scale optimization problems by identifying a small subset of the constraints and/or variables and solving the resulting smaller optimization problem instead. Such small subsets are known as "core sets." For a certain class of optimization problems, one can explicitly compute such a small subset with the property that the resulting optimal solution is a close approximation of the optimal solution of the original problem. Such problems mainly include geometric optimization problems such as minimum containment, clustering, and classification. In this talk, we review the recent results in this area and provide a unifying framework. In particular we discuss how the existence of small core sets forms a basis for the design of efficient algorithms for large-scale optimization problems.

Speaker Bio: After earning his B.S. degree in Industrial Engineering at Bilkent University in Turkey, Emre Alper Yıldırım received his M.S. and Ph.D. degrees in Operations Research from Cornell University, USA under the supervision of Michael Todd. He worked as an Assistant Professor at the Department of Applied Mathematics and Statistics at Stony Brook University, USA and as an Assistant Professor and Associate Professor at the Department of Industrial Engineering at Bilkent University, Turkey. Since Februrary 2011, he has been working as an Associate Professor at the Department of Industrial Engineering at Koc University. His main research interests are in optimization theory, algorithms, and applications.