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1003-65-1101 **Isao Yamada*** (isao@comm.ss.titech.ac.jp), Dept. of Communications and Integrated Sys., Tokyo Institute of Technology, S-60, Ookayama, Meguro-ku, 152-8552 Tokyo, Japan. *Hybrid Steepest Descent Method and Adaptive Projected Subgradient Method — Their Unified View and Signal Processing Applications.*

In this talk, we introduce recently developed mathmatical techniques: the *hybrid steepest descent method* and the *adaptive projected subgradient method*, and their rich applications to broad range of signal and image processing problems.

The *hybrid steepest descent method* can minimize smooth convex functions over the fixed point set of certain quasi-nonexpansive mappings in a real Hilbert space, and therefore it is applicable to broad range of convexly constrained nonlinear inverse problems as well as convex optimization problems defined over the level set of nonsmooth convex functions.

The *adaptive projected subgradient method* can minimize asymptotically *certain sequence of nonnegative convex functions* over a closed convex set in a real Hilbert space, and therefore it can handle a time-varying versions of nonsmooth-nonnegative convex optimization problems, where the convex objective itself keeps changing in the whole process. The *adaptive projected subgradient method* can serve as a unified guiding principle of a wide range of *set-theoretic adaptive filtering schemes* for nonstationary random processes.

Part of this talk includes recent joint works with Dr. N. Ogura and Dr. K. Slavakis of Tokyo Institute of Technology. (Received October 04, 2004)