1046-41-1541 **Isao Yamada*** (isao@comm.ss.titech.ac.jp), Dept of Communications and Integrated Sys, Tokyo Institute of Technology, S3-60, Ookayama, Meguro-ku, Tokyo, 152-8550, and **Tomasz Piotrowski** (tpiotrowski@comm.ss.titech.ac.jp), Dept of Communications and Integrated Sys, Tokyo Institute of Technology, S3-60, Ookayama, Meguro-ku, Tokyo, 152-8550.

Minimum-Variance Pseudo-Unbiased Reduced-Rank Estimator and Its Applications.

We introduce central idea of the MV-PURE (Minimum-Variance Pseudo-Unbiased Reduced-Rank Estimator), by Yamada and Elbadraoui (2006), by Piotrowski and Yamada (2008), which was established recently as a novel robust estimator for ill-conditioned linear inverse problems. The MV-PURE is defined as a closed form solution of a hierarchical nonconvex constrained optimization problem and achieves the minimum variance among all solutions of the first stage optimization problem for minimizing, under a rank constraint, simultaneously all unitarily invariant norms of an operator applied to the unknown parameter vector in view of suppressing bias of the estimator. The MV-PURE is a unified extension of well-known estimators: the Gauss-Markov estimator (BLUE: Best Linear Unbiased Estimator), the generalized Marquardt's reduced-rank estimator and the Chipman's minimum-variance conditionally unbiased affine estimator subject to linear restrictions. The remarkable applicability of the MV-PURE is found not only in a broad range of ill-conditioned inverse problems (e.g., an interpolation in reproduction kernel Hilbert space) but also in certain stochastic estimations of random vectors under imperfect model knowledge (e.g., a linear detection in a MIMO wireless communication systems). (Received September 16, 2008)