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**Mituhiko Fukuda\*** (mituhiko@is.titech.ac.jp), **Takashi Nakagaki** and **Makoto Yamashita**. *A new nonmonotone spectral projected gradient method for semidefinite program with log-determinant and  $\ell_1$ -norm function*. Preliminary report.

The semidefinite program which has a log-determinant and  $\ell_1$ -norm terms in the objective function can be used to solve the covariance selection problem, that is, a problem to estimate a covariance matrix from few observations compared to the dimension of random variables in statistics. We propose a novel variant of the nonmonotone spectral projected gradient method applied to its dual which can solve the problem with optimality certificate in some simple cases including the covariance selection problem. The implementation is very simple and major computational efforts required per iteration are a Cholesky decomposition and an eigenvalue computation. Numerical experiments on synthetic data shows that it is more efficient than some known algorithms. (Received December 23, 2014)