

Vector least-squares solutions for coupled singular matrix equations

ABSTRACT

The weighted least-squares solutions of coupled singular matrix equations are too difficult to obtain by applying matrices decomposition. In this paper, a family of algorithms are applied to solve these problems based on the Kronecker structures. Subsequently, we construct a computationally efficient solutions of coupled restricted singular matrix equations. Furthermore, the need to compute the weighted Drazin and weighted Moore-Penrose inverses; and the use of Tian's work and Lev-Ari's results are due to appearance in the solutions of these problems. The several special cases of these problems are also considered which includes the well-known coupled Sylvester matrix equations. Finally, we recover the iterative methods to the weighted case in order to obtain the minimum D-norm G-vector least-squares solutions for the coupled Sylvester matrix equations and the results lead to the least-squares solutions and invertible solutions, as a special case. © 2006 Elsevier B.V. All rights reserved.

Keyword: Generalized inverses, Iterative methods, Kronecker products, Matrix least-squares problems, Matrix norms