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Brian D. Sutton*, Department of Mathematics, Randolph-Macon College, P. O. Box 5005,
Ashland, VA 23005. *Computing the complete CS decomposition.*

We develop an algorithm for computing the complete CS decomposition (CSD) of a partitioned unitary matrix. The first stage reduces the matrix to bidiagonal block form, as described by Sutton and Edelman. The second stage invokes techniques from bidiagonal SVD algorithms of Golub, Kahan, and Demmel. Most existing CSD algorithms compute what we call the 2-by-1 CSD, which applies to matrices with orthonormal columns partitioned into a 2-by-1 block structure. The complete CSD applies to unitary matrices partitioned into a 2-by-2 block structure and has been considered more difficult to compute. (Received September 10, 2007)