

[Laub, Alan J.](#); [Heath, Michael T.](#); [Paige, Chris C.](#); [Ward, Robert C.](#)

Computation of system balancing transformations and other applications of simultaneous diagonalization algorithms. (English) [Zbl 0624.93025](#)

IEEE Trans. Autom. Control 32, 115-122 (1987).

The system balancing introduced by *B. C. Moore* [*SIAM J. Sci. Stat. Comput.* 7, 1147-1159 (1986; [Zbl 0607.65013](#))] as a tool for system reduction is treated from the numerical point of view. The authors apply their algorithm [*ibid.* AC-26, 17-32 (1981; [Zbl 0464.93022](#))] to the computation of the singular value decomposition of a product of matrices. They compute the contragredient transformation which diagonalizes both observability and reachability Gramians. They compute Cholesky factors of the Gramians, compute singular value decompositions of the product of the Cholesky factors, form contragredient transformations and form the balanced state-space matrices.

Reviewer: [A. Vaněček](#)

MSC:

[93B40](#) Computational methods in systems theory (MSC2010)
[65F99](#) Numerical linear algebra
[93C05](#) Linear systems in control theory
[15A18](#) Eigenvalues, singular values, and eigenvectors
[93B05](#) Controllability
[93B07](#) Observability
[93B17](#) Transformations

Cited in **1** Review
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Keywords:

system balancing; system reduction; contragredient transformation; observability and reachability Gramians; Cholesky factors; singular value decompositions

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