MATRIX EXPONENTIALS AND INVERSION OF CONFLUENT VANDERMONDE MATRICES *

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Abstract. For a given matrix $A$ we compute the matrix exponential $e^{tA}$ under the assumption that the eigenvalues of $A$ are known, but without determining the eigenvectors. The presented approach exploits the connection between matrix exponentials and confluent Vandermonde matrices $V$. This approach and the resulting methods are very simple and can be regarded as an alternative to the Jordan canonical form methods. The discussed inversion algorithms for $V$ as well as the matrix representation of $V^{-1}$ are of independent interest also in many other applications.

Key words. matrix exponential, Vandermonde matrix, fast algorithm, inverse.

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