

EXPLICIT SOLUTIONS OF REGULAR LINEAR DISCRETE-TIME DESCRIPTOR SYSTEMS WITH CONSTANT COEFFICIENTS*

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Abstract. Explicit solution formulas are presented for systems of the form $Ex^{k+1} = Ax^k + f^k$ with $k \in \mathbb{K}$, where $\mathbb{K} \subset \mathbb{Z}$ is a discrete interval and the pencil $\lambda E - A$ is regular. Different results are obtained when one starts with an initial condition at the point $k = 0$ and calculates into the future (i.e., $Ex^{k+1} = Ax^k + f^k$ with $k \in \mathbb{N}$) and when one wants to get a complete solution (i.e., $Ex^{k+1} = Ax^k + f^k$ with $k \in \mathbb{Z}$).

Key words. Descriptor system, Strangeness index, Linear discrete descriptor system, Explicit solution, Backward Leslie model.

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