

**PARAMETRIZATION OF CONTRACTIVE
BLOCK-OPERATOR MATRICES AND PASSIVE
DISCRETE-TIME SYSTEMS**

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The discrete-time system $\tau = \left\{ \begin{pmatrix} A & B \\ C & D \end{pmatrix}; \mathfrak{H}, \mathfrak{M}, \mathfrak{N} \right\}$ is called passive if the operator

$$T = \begin{pmatrix} A & B \\ C & D \end{pmatrix} : \begin{pmatrix} \mathfrak{H} \\ \mathfrak{M} \end{pmatrix} \rightarrow \begin{pmatrix} \mathfrak{H} \\ \mathfrak{N} \end{pmatrix}$$

is a contraction. The transfer function $\Theta(z) = D + zC(I - zA)^{-1}B$ of the passive system belongs to the Schur class $\mathbf{S}(\mathfrak{M}, \mathfrak{N})$ of $\mathcal{L}(\mathfrak{M}, \mathfrak{N})$ - valued functions, holomorphic in the unit disk \mathbb{D} . It is well known that the blocks of contractive matrices admit a parametrization. This parametrization allows to establish some known as well as new properties of the corresponding passive systems and their transfer functions. The lecture is a survey of recent results in this direction.