

NOTATIONS AND SYMBOLS

\mathbb{R}	field of real numbers
$\mathbb{R}^{m \times n}$	set of all real matrices of order $m \times n$
$\mathbb{C}^{m \times n}$	set of complex matrices of order $m \times n$
\mathbb{C}	field of complex numbers
\in	belongs to
$> (\geq)$	positive definiteness (semi-definiteness)
$Re(\alpha)$	real part of $\alpha \in \mathbb{C}$
$Im(\alpha)$	imaginary part of $\alpha \in \mathbb{C}$
$\delta(t)$	unit impulse
$\Omega(M)$	spectrum of the matrix M
C_M	controllability matrix
O_M	observability matrix
C_G	controllability Grammian
O_G	observability Grammian
$Ker(A), N(A)$	Kernel and nullspace of A
S^\perp	orthogonal subspace of S
■	end of proof
I_s	Identity matrix of order s (Default for an $n \times n$ identity matrix is I)
A^T	transpose of A
A^*	complex conjugate transpose of A
A^{-1}	inverse of A
$In(A)$	inertia of A
$\beta(A)$	distance of A to a set of unstable matrices
$\mu(A, B)$	distance of (A, B) to uncontrollability
$\ G\ _\infty$	H_∞ - norm of the stable transfer function $G(s)$
$diag(d_1, \dots, d_n)$	an $n \times n$ diagonal matrix with d_1, \dots, d_n on the diagonal
SVD	singular value decomposition
QR	QR factorization
trace (A)	trace of the matrix A

$\begin{bmatrix} A & B \\ C & D \end{bmatrix}$	state space realization: $C(SI - A)^{-1}B + D$
$G(s)$	transfer function matrix
$\ A\ $	2-norm of A
$\ A\ _F$	Frobenius norm of A
$\sigma_{\min}(A)$	smallest singular value of A
$\sigma_{\max}(A)$	largest singular value of A
\simeq	approximately equal to
$R(A)$	range of A
$\bar{\sigma}(A)$	largest singular value of A
$\sigma_i(A)$	i th singular value of A
Σ	diagonal matrix containing singular values
CARE	continuous-time algebraic Riccati equation
DARE	discrete-time algebraic Riccati equation