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## Part I Single Input Single Output systems

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## ACRONYMS

- BIBO** - Bounded-input-bounded-output.  
**BR** - Bounded real.  
**EP** - Exactly proper.  
**LQG** - Linear-quadratic-Gaussian.  
**LQR** - Linear-quadratic-regulator.  
**PA** - Positive analytic.  
**p.i.p.** - Parity interlacing property.  
**PR** - Positive real.  
**RHP** - Right-half-plane.  
**SBR** - Strictly bounded real.  
**SPR** - Strictly positive real.

## COMMON SYMBOLS

- $\mathbb{R}^{n \times m}$  - Space of  $n \times m$  matrices with real entries.  
 $X^T$  - Transpose of matrix  $X$ .  
 $\bar{X}$  - Complex conjugate of matrix  $X$ .  
 $\|X\|$  - Norm of matrix  $X$ .  
 $\sigma(X)$  - Singular value of matrix  $X$ .  
 $|X|$  - Determinant of matrix  $X$ .  
 $\rho(X)$  - Spectral radius of matrix  $X$ .  
 $G^*(s)$  -  $G^T(-s)$ .  
 $\|F(s)\|_{\infty}$  -  $H^{\infty}$  norm of function  $F(s)$ .  
 $H^{\infty}$  - Hardy space with bounded  $H^{\infty}$  norm.  
 $M(H^{\infty})$  - Space of matrices with  $H^{\infty}$  entries.  
 $\|F(s)\|_H$  - Hankel norm of function  $F(s)$ .  
 $\sup \Phi(\omega)$  - Limit superior of function  $\Phi(\omega)$ .