# ΤΥΠΟΛΟΓΙΟ

## *ΜΕΤΑΣΧΗΜΑΤΙΣΜΟΙ LAPLACE*

| $f(t)$ | $F(s)$ |
|---|---|
| $\delta(t)$ | $1$ |
| $1,\ t>0$ | $1/s$ |
| $u(t-k)$ | $e^{-ks}/s$ |
| $e^{-kt}$ | $\frac{1}{s+k}$ |
| $t^n$ | $\frac{n!}{s^{n+1}}=\frac{\Gamma(n+1)}{s^{n+1}} \quad n>0$ |
| $t^n e^{-kt}$ | $\frac{n!}{(s+k)^{n+1}}=\frac{\Gamma(n+1)}{(s+k)^{n+1}} \quad n>0$ |
| $\sin(\omega t+\varphi)$ | $\frac{s\sin\varphi+\omega\cos\varphi}{s^2+\omega^2}$ |
| $\cos(\omega t+\varphi)$ | $\frac{s\cos\varphi-\omega\sin\varphi}{s^2+\omega^2}$ |
| $e^{-at}\sin\omega t$ | $\frac{\omega}{(s+a)^2+\omega^2}$ |
| $e^{-at}\cos\omega t$ | $\frac{s+a}{(s+a)^2+\omega^2}$ |
| $\frac{e^{-at}-e^{-bt}}{b-a}$ | $\frac{1}{(s+a)(s+b)}$ |

$$f(t)=L^{-1}\{F(s)\}$$

$$L\{f(t)\}=F(s)=\int_0^\infty e^{-st}f(t)dt$$

## *ΙΣΟΔΥΝΑΜΙΕΣ ΠΑΡΑΜΕΤΡΩΝ*

| | [Z] | [Y] | [h] | [T] |
|---|---|---|---|---|
| **[Z]** | $\begin{bmatrix} z_{11} & z_{12} \\ z_{21} & z_{22} \end{bmatrix}$ | $\frac{1}{\Delta_Y}\begin{bmatrix} y_{22} & -y_{12} \\ -y_{21} & y_{11} \end{bmatrix}$ | $\frac{1}{h_{22}}\begin{bmatrix} \Delta_H & h_{12} \\ -h_{21} & 1 \end{bmatrix}$ | $\frac{1}{C}\begin{bmatrix} A & \Delta_T \\ 1 & D \end{bmatrix}$ |
| **[Y]** | $\frac{1}{\Delta_Z}\begin{bmatrix} z_{22} & -z_{12} \\ -z_{21} & z_{11} \end{bmatrix}$ | $\begin{bmatrix} y_{11} & y_{12} \\ y_{21} & y_{22} \end{bmatrix}$ | $\frac{1}{h_{11}}\begin{bmatrix} 1 & -h_{12} \\ h_{21} & \Delta_H \end{bmatrix}$ | $\frac{1}{B}\begin{bmatrix} D & -\Delta_T \\ -1 & A \end{bmatrix}$ |
| **[h]** | $\frac{1}{z_{22}}\begin{bmatrix} \Delta_Z & z_{12} \\ -z_{21} & 1 \end{bmatrix}$ | $\frac{1}{y_{11}}\begin{bmatrix} 1 & -y_{12} \\ y_{21} & \Delta_Y \end{bmatrix}$ | $\begin{bmatrix} h_{11} & h_{12} \\ h_{21} & h_{22} \end{bmatrix}$ | $\frac{1}{D}\begin{bmatrix} B & \Delta_T \\ -1 & C \end{bmatrix}$ |
| **[T]** | $\frac{1}{z_{21}}\begin{bmatrix} z_{11} & \Delta_Z \\ 1 & z_{22} \end{bmatrix}$ | $\frac{1}{y_{21}}\begin{bmatrix} -y_{22} & -1 \\ -\Delta_Y & -y_{11} \end{bmatrix}$ | $\frac{1}{h_{21}}\begin{bmatrix} -\Delta_H & -h_{11} \\ -h_{22} & -1 \end{bmatrix}$ | $\begin{bmatrix} A & B \\ C & D \end{bmatrix}$ |

$\Delta_H = h_{11}h_{22}-h_{12}h_{21}$

$\Delta_Y = y_{11}y_{22}-y_{12}y_{21}$

$\Delta_Z = z_{11}z_{22}-z_{12}z_{21}$

$\Delta_T = AD-BC$