

## Základní vzorce Laplaceovy transformace

1.  $\mathcal{L}f(t) = \int_0^{+\infty} f(t)e^{-pt} dt = F(p)$
2.  $\mathcal{L} \sum_{i=1}^n c_i f_i(t) = \sum_{i=1}^n c_i F_i(p)$
3.  $\mathcal{L}\{e^{at}f(t)\} = F(p-a)$
4.  $\mathcal{L}\{tf(t)\} = -F'(p)$
5.  $\mathcal{L}f'(t) = pF(p) - f(0+)$
6.  $\mathcal{L}f^{(n)}(t) = p^n F(p) - p^{n-1}f(0+) - p^{n-2}f'(0+) - \dots - p f^{(n-2)}(0+) - f^{(n-1)}(0+)$
7.  $\mathcal{L} \int_0^t f(\tau) d\tau = \frac{F(p)}{p}$
8.  $\mathcal{L}\{f(t-a)1(t-a)\} = e^{-ap}F(p) \quad \text{pro } a \geq 0$
9.  $\mathcal{L}^{-1} \frac{P_m(p)}{Q_n(p)} = \sum_{i=1}^n \frac{P_m(p_i)}{Q'_n(p_i)} e^{p_i t}, \quad Q'_n = \frac{Q_n(p)}{p-p_i}$

## Slovník Laplaceovy transformace

| Obraz                                       | Předmět                         |
|---|---------------------------------|
| $\frac{1}{p}$                               | 1                               |
| $\frac{1}{p^n}$                             | $\frac{t^{n-1}}{(n-1)!}$        |
| $\frac{1}{p-a}$                             | $e^{at}$                        |
| $\frac{1}{(p-a)^n}$                         | $\frac{t^{n-1} e^{at}}{(n-1)!}$ |
| $\frac{\omega}{p^2 + \omega^2}$             | $\sin \omega t$                 |
| $\frac{p}{p^2 + \omega^2}$                  | $\cos \omega t$                 |
| $\frac{a}{p^2 - a^2}$                       | $\sinh at$                      |
| $\frac{p}{p^2 - a^2}$                       | $\cosh at$                      |
| $\frac{p}{p^2 - a^2}$                       | $\cosh at$                      |
| $\frac{2\omega p}{p^2 + \omega^2}$          | $t \sin \omega t$               |
| $\frac{p^2 - \omega^2}{(p^2 + \omega^2)^2}$ | $t \cos \omega t$               |
| $\frac{\omega}{(p-a)^2 + \omega^2}$         | $e^{at} \sin \omega t$          |
| $\frac{p-a}{(p-a)^2 + \omega^2}$            | $e^{at} \cos \omega t$          |