

THE LAPLACE TRANSFORM

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|-----------------------------------|-----------------------------------|
| $f(t) = \mathcal{L}^{-1}\{F(s)\}$ | $F(s) = \mathcal{L}\{f(t)\}$ |
| 1. $e^{at}f(t)$ | $F(s - a)$ |
| 2. 1 | $\frac{1}{s}$ |
| 3. e^{at} | $\frac{1}{s - a}$ |
| 4. t^n | $\frac{n!}{s^{n+1}}$ |
| 5. $t^n e^{at}$ | $\frac{n!}{(s - a)^{n+1}}$ |
| 6. $\sin bt$ | $\frac{b}{s^2 + b^2}$ |
| 7. $\cos bt$ | $\frac{s}{s^2 + b^2}$ |
| 8. $e^{at} \sin bt$ | $\frac{b}{(s - a)^2 + b^2}$ |
| 9. $e^{at} \cos bt$ | $\frac{s - a}{(s - a)^2 + b^2}$ |
| 10. $t \sin bt$ | $\frac{2bs}{(s^2 + b^2)^2}$ |
| 11. $t \cos bt$ | $\frac{s^2 - b^2}{(s^2 + b^2)^2}$ |
| 12. $u_c(t)$ | $\frac{e^{-cs}}{s}$ |
| 13. $u_c(t)f(t - c)$ | $e^{-cs}F(s)$ |
| 14. $\delta(t - c)$ | e^{-cs} |
| 15. $\dot{x}(t)$ | $sX(s) - x(0)$ |
| 16. $\ddot{x}(t)$ | $s^2X(s) - sx(0) - \dot{x}(0)$ |