

## 18.03SC Practice Problems 27

### Laplace transform

### Solution suggestions

1. Use the rules and formulas to find the Laplace transform of  $e^{-t}(t^2 + 1)$ .

By linearity and the formulas, the transform of  $t^2 + 1$  is

$$\mathcal{L}[t^2 + 1] = \frac{2}{s^3} + \frac{1}{s} = \frac{2 + s^2}{s^3}.$$

So, by  $s$ -shift, the transform of the entire expression is

$$\begin{aligned}\mathcal{L}[e^{-t}(t^2 + 1)] &= \frac{2 + (s + 1)^2}{(s + 1)^3} \\ &= \frac{s^2 + 2s + 3}{(s + 1)^3}.\end{aligned}$$

MIT OpenCourseWare  
<http://ocw.mit.edu>

18.03SC Differential Equations  
Fall 2011

For information about citing these materials or our Terms of Use, visit: <http://ocw.mit.edu/terms>.