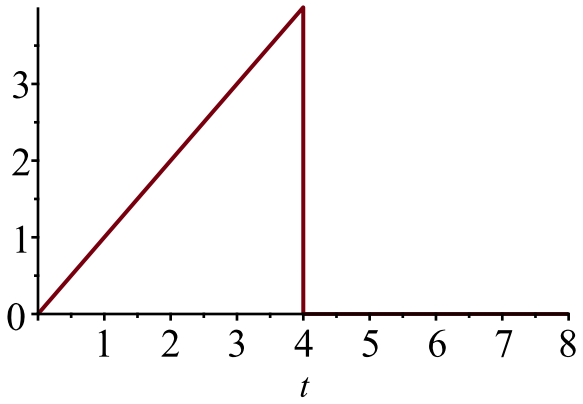
>

Example for solving and graphing with step function:

> $F := t \to t - t \cdot \text{Heaviside}(t-4);$

$$F := t \mapsto t - t\,\text{Heaviside}(t-4) \tag{1}$$

> $plot(F(t), t=0..8);$




> $de := diff(y(t), t\$2) - 2 \cdot diff(y(t), t) + 2 \cdot y(t) = F(t);$

$$de := \frac{d^2}{dt^2} y(t) - 2 \frac{d}{dt} y(t) + 2\,y(t) = t - t\,\text{Heaviside}(t-4) \tag{2}$$

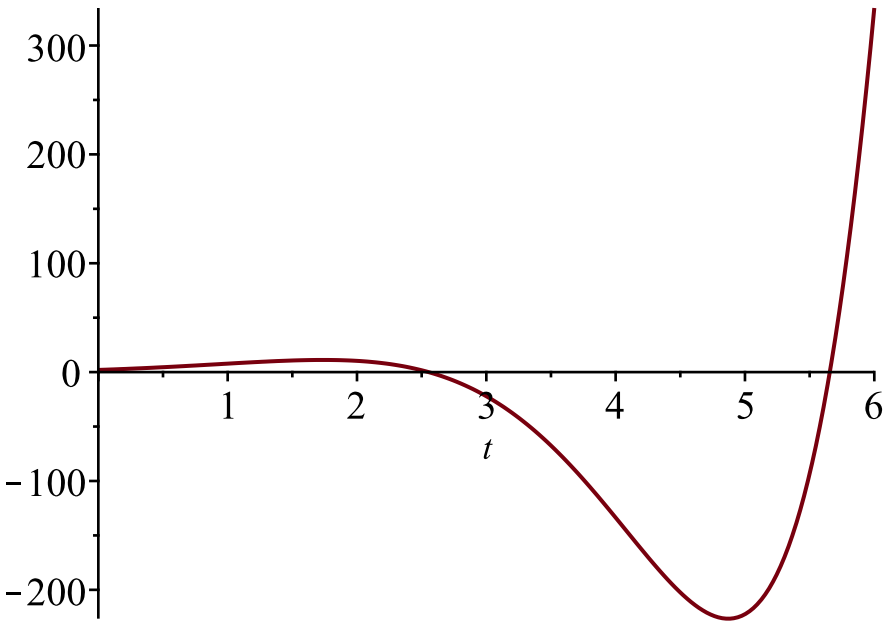
> $dsolve(\{de, y(0)=2, D(y)(0)=4\}, y(t));$

$$y(t) = 2\,e^t \sin(t) + \frac{3\,e^t \cos(t)}{2} + \frac{\left((5\cos(t-4) - 4\sin(t-4))\,e^{t-4} - t - 1\right)\text{Heaviside}(t-4)}{2} + \frac{t}{2} + \frac{1}{2} \tag{3}$$

> $z := unapply(rhs(\%), t);$

$$z := t \mapsto 2\,e^t \sin(t) + \frac{3\,e^t \cos(t)}{2} + \frac{\left((5\cos(t-4) - 4\sin(t-4))\,e^{t-4} - t - 1\right)\text{Heaviside}(t-4)}{2} + \frac{t}{2} + \frac{1}{2} \tag{4}$$

> $plot(z(t), t=0..6);$


300
200
100
0
-100
-200
1
2
3
4
5
6
t