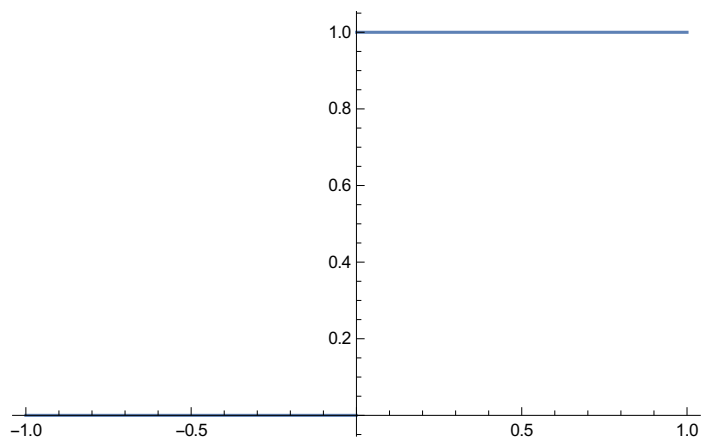


An oscillator with a switch in forcing

```
Plot[HeavisideTheta[t], {t, -1, 1}]
```



$$x'' + x' + 3x = H(t - 10) \cos(2t)$$

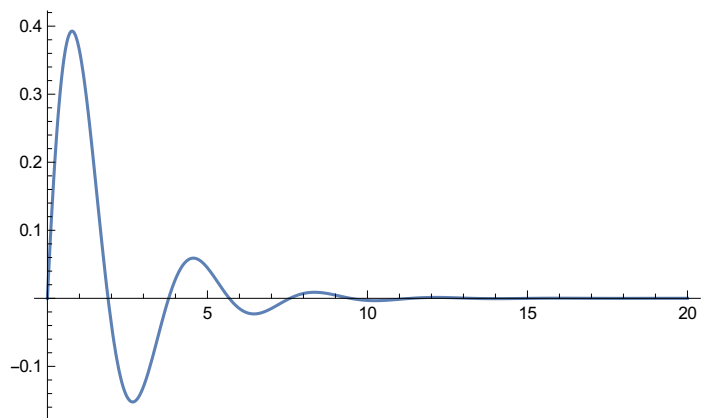
$$x(0) = 0$$

$$x'(0) = 1$$

$$x_h[t_] = 2 E^{(-t/2)} \sin[\sqrt{11} t / 2] / \sqrt{11}$$

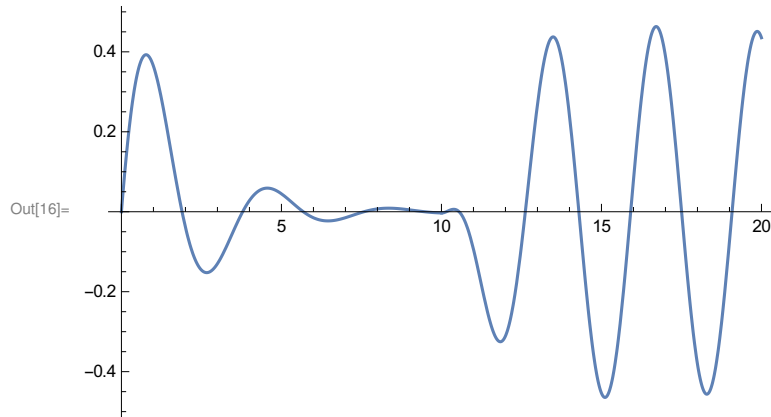
$$\frac{2 e^{-t/2} \sin\left[\frac{\sqrt{11} t}{2}\right]}{\sqrt{11}}$$

```
Plot[xh[t], {t, 0, 20}, PlotRange -> All]
```

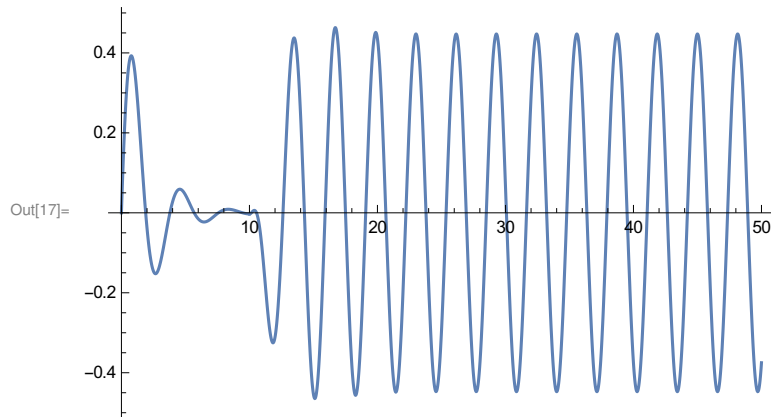


```
In[15]:= x[t_] = xh[t] + HeavisideTheta[t - 10]
          (E^((10 - t) / 2) ( (Cos[20] - 2 Sin[20]) Cos[Sqrt[11] (t - 10) / 2] - (7 Cos[20]
            + 6 Sin[20]) Sin[Sqrt[11] (t - 10) / 2] / Sqrt[11]) -
          (Cos[20] - 2 Sin[20]) Cos[2 (t - 10)] + (2 Cos[20] + Sin[20]) Sin[2 (t - 10)]) / 5;
```

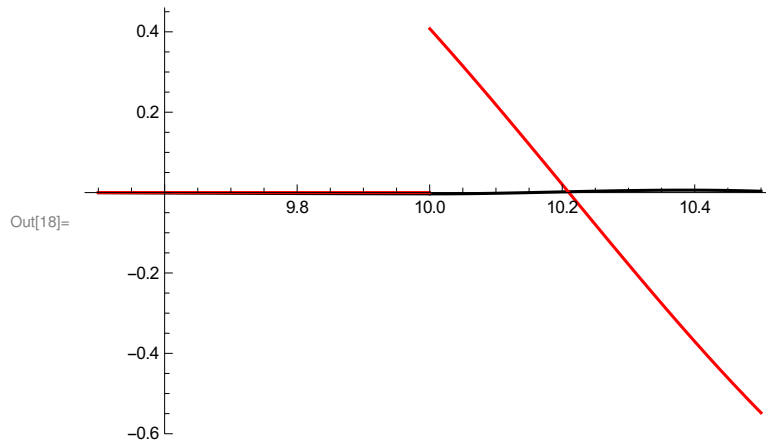
```
In[16]:= Plot[x[t], {t, 0, 20}]
```



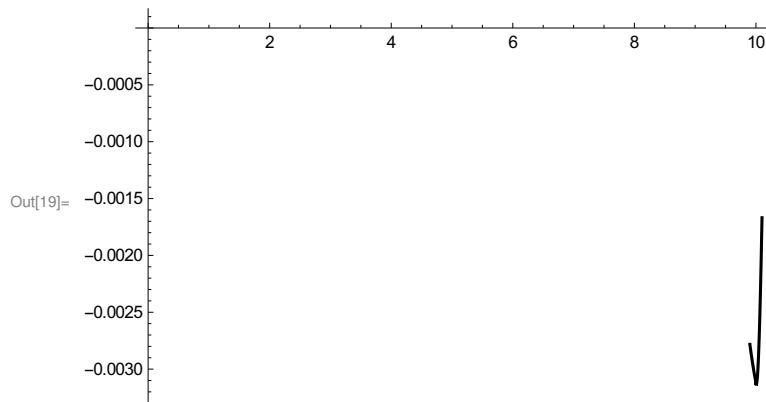
```
In[17]:= Plot[x[t], {t, 0, 50}]
```



```
In[18]:= Plot[{x[t], HeavisideTheta[t - 10] Cos[2 t]},  
             {t, 9.5, 10.5}, PlotStyle -> {Black, Red}, PlotRange -> All]
```



```
In[19]:= Plot[x[t], {t, 9.9, 10.1}, PlotStyle -> Black, PlotRange -> All, AxesOrigin -> {0, 0}]
```



```
In[20]:= Plot[x[t], {t, 9.9, 10.1}, PlotStyle -> Black, PlotRange -> All]
```

