

## Hermite interpolation problem for Homework 4

Using the Newton divided differences form, find the polynomial of degree  $\leq 3$  such that  $p(0) = 1, p'(0) = 2, p(1) = 1, p'(1) = -1$ .

*Hint: use the properties of Newton divided differences when some of the node points  $x_j$  are coincident, namely (4.29) and (4.30) in Section 4.1.5.*

$$\begin{array}{ccccccc}
 x_0 & | & f(x_0) & & & & \\
 & & \searrow & & & & \\
 x_0 & | & f(x_0) & \rightarrow & f'(x_0) & & \\
 & & \searrow & & & & \\
 x_1 & | & f(x_1) & \rightarrow & f[x_0, x_1] & \rightarrow & f[x_0, x_0, x_1] \\
 & & \searrow & & \searrow & & \\
 x_1 & | & f(x_1) & \rightarrow & f'(x_1) & \rightarrow & f[x_0, x_1, x_1] & \rightarrow & f[x_0, x_0, x_1, x_1]
 \end{array}$$