

3.5 Problems

Problem 1. Determine the natural cubic spline S that interpolates the data $f(0) = 0$, $f(1) = 1$, $f(2) = 2$.

Problem 2. Determine the clamped cubic spline s that interpolates the data $f(0) = 0$, $f(1) = 1$, $f(2) = 2$ and satisfies $s'(0) = s'(2) = 1$

Problem 3. Suppose $\{x_i f(x_i)\}_{i=1}^n$ lie on a straight line. What can be said about the natural and clamped cubic splines for the function f ?

3.6 Problems

Problem 4. Let $(x_0, y_0) = (0, 0)$ and $(x_1, y_1) = (5, 2)$ be the endpoints of a curve. Use the given guidepoints to construct parametric cubic Hermite approximations $(x(t), y(t))$ to the curve and graph the approximations (a) $(1, 1)$ and $(6, 1)$ (b) $(2, 2)$ and $(7, 0)$

4.1 Problems

Problem 5. Use the forward-difference formulas and backward-difference formulas to determine each missing entry in the following table:

x	$f(x)$	$f'(x)$
.5	.4794	
.6	.5646	
.7	.6442	

Problem 6. For the previous problem, $f(x) = \sin(x)$. Determine the actual error and find error bounds using the error formulas.