Numerical Analysis   Assignment #6 +

1. (a) For n+1 distinct nodes x_ν, show that

$$[x_0, x_1, \cdots, x_n]f = \sum_{\nu=0}^{n} \frac{f(x_\nu)}{\prod_{\mu \neq \nu}(x_\nu - x_\mu)}.$$

   (b) Show that

$$[x_0, x_1, \cdots, x_n](fg_j) = [x_0, x_1, \cdots, x_{j-1}, x_{j+1}, \cdots, x_n]f,$$

   where $g_j(x) = x - x_j$.

2. Let $f(x) = x^7$. Compute the fifth divided difference $[0, 1, 1, 1, 2, 2]f$ of f. It is known that this divided difference is expressible in terms of the fifth derivatives of f evaluated at some ξ, $0 < \xi < 2$. Determine ξ.