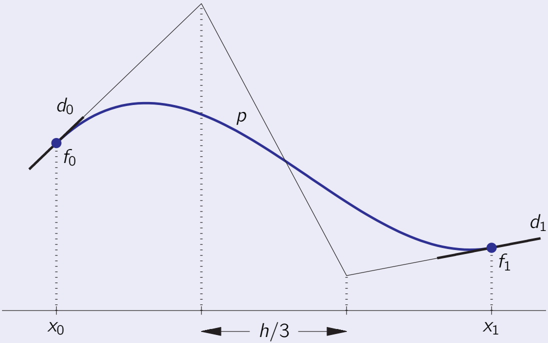
Hermite Interpolation

Values f_0, f_1 and derivatives d_0, d_1 at two points $x_0 < x_1$ can be interpolated by a cubic polynomial p. This Hermite interpolant can be expressed as linear combination of Bernstein polynomials transformed to the interval $[x_0, x_1]$:

$$p(x) = f_0 b_0^3(y) + (f_0 + d_0 h/3) b_1^3(y) + (f_1 - d_1 h/3) b_2^3(y) + f_1 b_3^3(y)$$

with $h = x_1 - x_0$ and $y = (x - x_0)/h$.



As illustrated in the figure, the Bernstein coefficients of the interpolant p form a polygon with equally spaced abscissae which touches p or, equivalently, the interpolated function at the interval endpoints.
If Hermite data are given at more than two points, the cubic interpolants form a so-called Hermite spline q. By construction, q is uniquely determined by its values and derivatives at the interpolation points and continuously differentiable there.