

Errors in printed notes
 Equations 24, 25, 26, 27: all yellow Ps should be parameterised by t
 Equation 25: magenta j-1 should be k-1
 Equation 25: deep purple i should be j
 Equation 26: blue j-1 should be m-1
 Equation 27: green should be noted as being true for all t
 Light purple reference to Equation 27 should be to Equation 26 (also in caption to Figure 11 on page 20)

Figure 10: An example of the construction of a cubic uniform B-spline. This example shows the construction of the central point in the piece of curve. The knot vector for this piece of curve is $[1, 2, 3, 4, 5, 6, 7, 8]$, the curve is defined in the range $t_4 \leq t < t_5$, the construction is shown for the point $t = 4\frac{1}{2}$. Keeping in mind that, in this example, $t_i = i$, we can see that the weights, α_i^m , are: $\alpha_2^1 = \frac{t-2}{5-2} = \frac{5}{6}$, $\alpha_3^1 = \frac{t-3}{6-3} = \frac{3}{6}$, $\alpha_4^1 = \frac{t-4}{7-4} = \frac{1}{6}$; $\alpha_3^2 = \frac{t-3}{5-3} = \frac{3}{4}$, $\alpha_4^2 = \frac{t-4}{6-4} = \frac{1}{4}$; $\alpha_4^3 = \frac{t-4}{5-4} = \frac{1}{2}$.

$$= \sum_{i=j-k+1+m}^j N_{i,k-m}(t) \mathbf{P}_i^m, \quad t_j \leq t < t_{j+1}, \quad 0 \leq m \leq j-1 \quad (24)$$

$$= \mathbf{P}_0^{j-1}, \quad t_j \leq t < t_{j+1} \quad (25)$$

where:

$$\mathbf{P}_i^m = (1 - \alpha_i^m) \mathbf{P}_{i-1}^{m-1} + \alpha_i^m \mathbf{P}_i^{m-1} \quad (26)$$

$$\mathbf{P}_i^0 = \mathbf{P}_i \quad (27)$$

$$\alpha_i^m = \frac{t - t_i}{t_{i+k-m} - t_i} \quad (28)$$

Figure 10 shows an example of this construction, where you should be able to see that the construction is simply combinations of linear blends of two points (Equation 27). Figure 11 provides an example comparing how the evaluation of a point on the curve relates to the construction of the basis functions that define the curve.

When implementing B-spline curve drawing, it is convenient to rescale the knot vector to the range $[0,1]$, that is so that $t_{\min} = 0$ and $t_{\max} = 1$. This is claimed to improve numerical accuracy in floating point arithmetic computation owing to the higher density of floating point numbers in this interval.