de Boor's algorithm

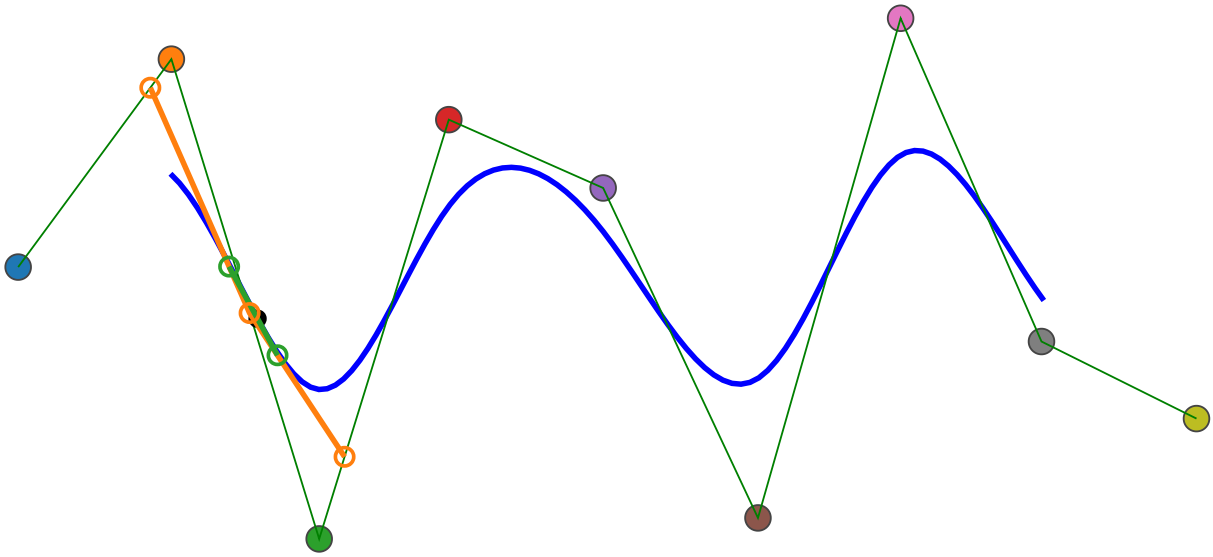
Similar to de Casteljau's algorithm for Bezier curves, we can apply de Boor's algorithm to find a point on a cubic B-spline at any value of t. This again uses a recursive algorithm, with:

$$P_i^r(t) = (1 - a_{i,r})P_{i-1}^{r-1}(t) + a_{i,r}P_i^{r-1}(t)$$

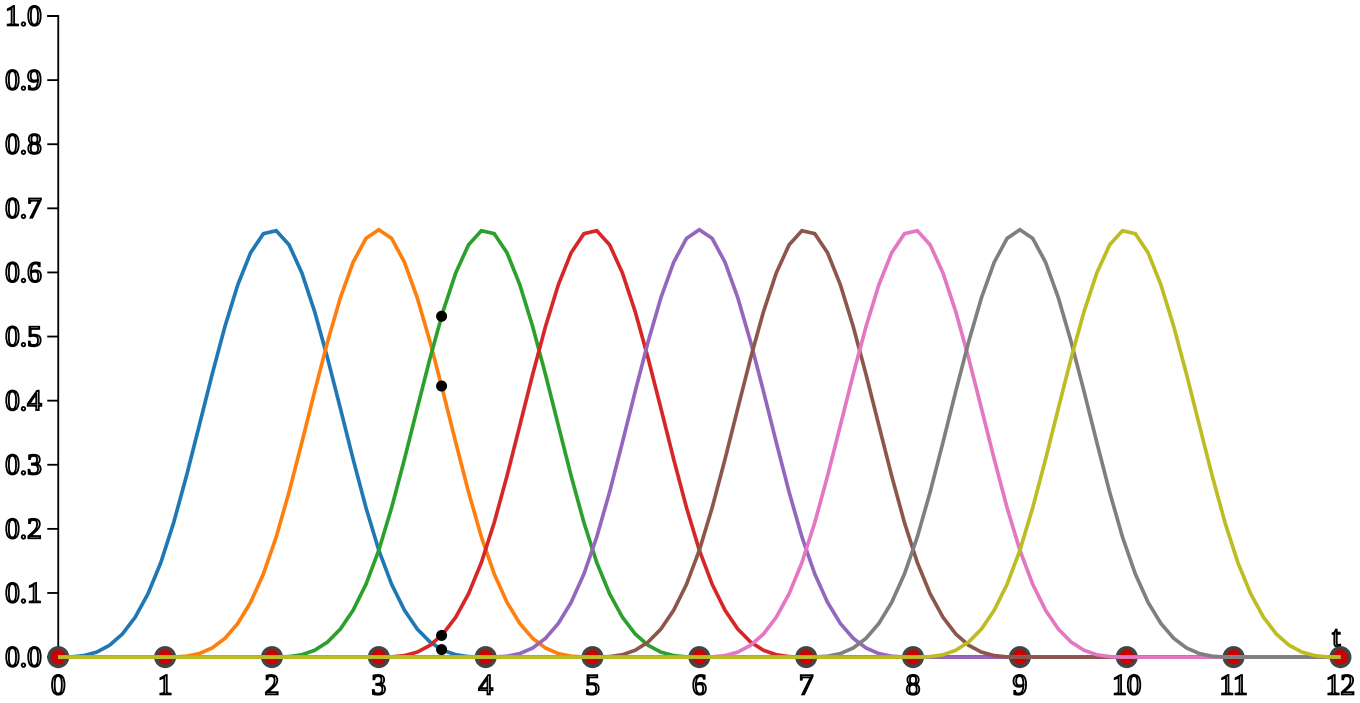
$$P_i^0 = P_i$$

$$a_{i,r} = \frac{t - t_i}{t_{i+n-r} - t_i}$$

where t_i is the knot for which $t_i \leq t \leq t_{i+1}$. For a curve of order n this is evaluated for $P_i^n(t)$. In the example below the curve has order four, and so the point on the curve depends on the four control points $P_{i-3}, \ldots, P_i$.



t = 3.59



For a uniform cubic B-spline as in the example above this is very similar to de Casteljau's algorithm, but with a different ratio of the points along the joining lines.