

**Example:** Let  $d = 3, s = 7$ , control points  $P_0, \dots, P_7$ , and knot sequence  $t = \{0, 1, 2, \dots, 11\}$ . Then the basic interval is  $[t_d, t_{N-d}] = [3, 8]$ . Let's compute the midpoint of this interval:  $t = 5.5 = \frac{11}{2}$ .

For  $t = 5.5 = \frac{11}{2}$ , we have  $J = 5$ .

Stages:  $p = 0, 1, 2, 3$

For each stage we have  $i = J - d + p, \dots, J$ , so we get:

$$p = 0: i = 2, 3, 4, 5$$

$$p = 1: i = 3, 4, 5$$

$$p = 2: i = 4, 5$$

$$p = 3: i = 5$$

$$\text{Stage } p = 0: P_2^0 = P_2, P_3^0 = P_3, P_4^0 = P_4, P_5^0 = P_5.$$

Stage  $p = 1$ : Computing the various parts of the recursive formula, we have:

$$t = \frac{11}{2}, t_i = i, i + d - (p - 1) = i + 3, t_{i+d-(p-1)} - t_i = i + 3 - i = 3, \text{ so}$$

$$P_i^{[1]} = \frac{\frac{11}{2} - i}{3} P_i^{[0]} + \frac{i + 3 - \frac{11}{2}}{3} P_{i-1}^{[0]}, \quad \text{which gives: } P_3^{[1]} = \frac{5}{6} P_3^{[0]} + \frac{1}{6} P_2^{[0]},$$

$$P_4^{[1]} = \frac{1}{2} P_4^{[0]} + \frac{1}{2} P_3^{[0]}, \quad \text{and} \quad P_5^{[1]} = \frac{1}{6} P_5^{[0]} + \frac{5}{6} P_4^{[0]}.$$

Stage  $p = 2$ : Computing the various parts of the recursive formula, we have:

$$t = \frac{11}{2}, t_i = i, i + d - (p - 1) = i + 2, t_{i+d-(p-1)} - t_i = i + 2 - i = 2, \text{ so}$$

$$P_i^{[2]} = \frac{\frac{11}{2} - i}{2} P_i^{[1]} + \frac{i + 2 - \frac{11}{2}}{2} P_{i-1}^{[1]}, \quad \text{which gives: } P_4^{[2]} = \frac{3}{4} P_4^{[1]} + \frac{1}{4} P_3^{[1]},$$

$$\text{and} \quad P_5^{[2]} = \frac{1}{4} P_5^{[1]} + \frac{3}{4} P_4^{[1]}.$$

Stage  $p = 3$ : Computing the various parts of the recursive formula, we have:

$$t = \frac{11}{2}, t_i = i, i + d - (p - 1) = i + 1, t_{i+d-(p-1)} - t_i = i + 1 - i = 1, \text{ so}$$

$$P_i^{[3]} = \frac{\frac{11}{2} - i}{1} P_i^{[2]} + \frac{i + 1 - \frac{11}{2}}{1} P_{i-1}^{[2]}, \quad \text{which gives: } P_5^{[3]} = \frac{1}{2} P_5^{[2]} + \frac{1}{2} P_4^{[2]}.$$

