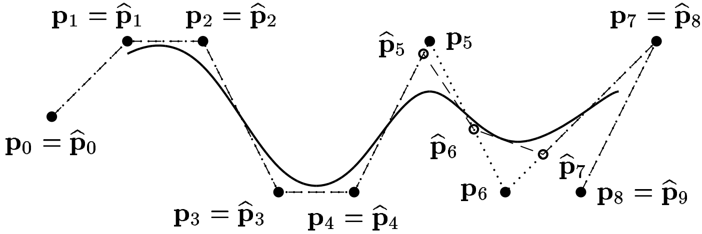
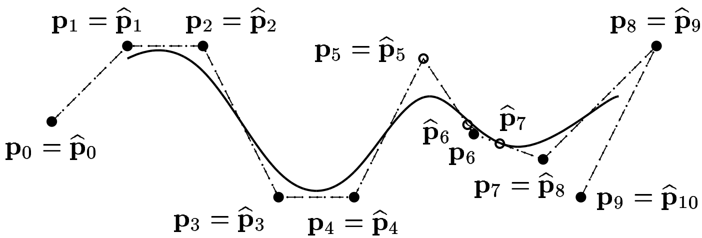


(a) Knot vector becomes $[0, 1, 2, 3, 4, 5, 6, 7, 7\frac{3}{4}, 8, 9, 10, 11]$.



(b) Knot vector becomes $[0, 1, 2, 3, 4, 5, 6, 7, 7\frac{3}{4}, 7\frac{3}{4}, 8, 9, 10, 11]$.

Figure VIII.14: Showing the insertion of knots into a degree three curve. The original knot vector is the uniform knot vector $[0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11]$. We insert the value $7\frac{3}{4}$ into the curve twice, each time adding a new control point, and making the control polygon more closely approximate the curve near $7\frac{3}{4}$. The dotted straight lines show the control polygon before the insertion of the new knot position. The dashed straight lines are the control polygon after the insertion. (In (b), the dashed line from $\widehat{\mathbf{p}}_6$ to $\widehat{\mathbf{p}}_7$ is so close to the curve that it cannot be seen in the graph.) The filled circles are the original control point positions. The open circles are the changed control point positions. The control points $\widehat{\mathbf{p}}_i$ of (a) are renamed $\mathbf{p}_i$ in (b). In both figures, one new knot has been inserted and some of the control points have been moved, but the B-spline curve itself is unchanged. If we inserted $7\frac{3}{4}$ a third time, then the new control point $\widehat{\mathbf{p}}_7$ would be equal to the point on the curve at $u = 7\frac{3}{4}$.