

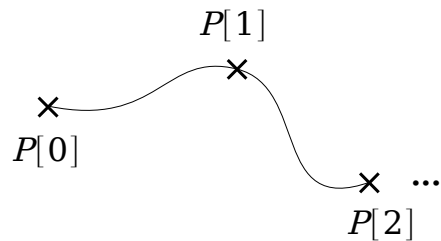
Exercise Computer graphics – (till April 28, 2009)

Splines

Exercise 13: Custom-made splines

A designer wants $N-1$ curves to interpolate N knots. He does not care for the derivation at the end-points. N is not known in advance.

- Invent a smooth and easy to calculate spline which satisfies these constraints. Keep the degree as low as possible.
- Implement your solution by altering one of your sample applications.



Exercise Computer graphics

Bezier curves

Exercise 14: Weights for the Bezier Blending function

In the lecture we have expressed the Bezier curve analytically. We started with the degenerated instance of the curve consisting of two points only and extended it to a bent curve using three and four points.

Both, the straight and the bent curve consisted of weights for each knot.

- a) Calculate the weights for each of the four knots. In other words, $P^{(3)}_0$ from the lecture should be expressed by using the points $P(0)_0, \dots, P(0)_3$. The curve is a weighted average of these points and in this context we are interested in the weights for each point.
- b) When going from 2, to 3 and finally to 4 knots, can you find a pattern or schema for the weights? Express the weight for knot n in a curve consisting of N knots.

Hint: Each weight contains a binomial coefficient as a factor.