## Bézier Patch

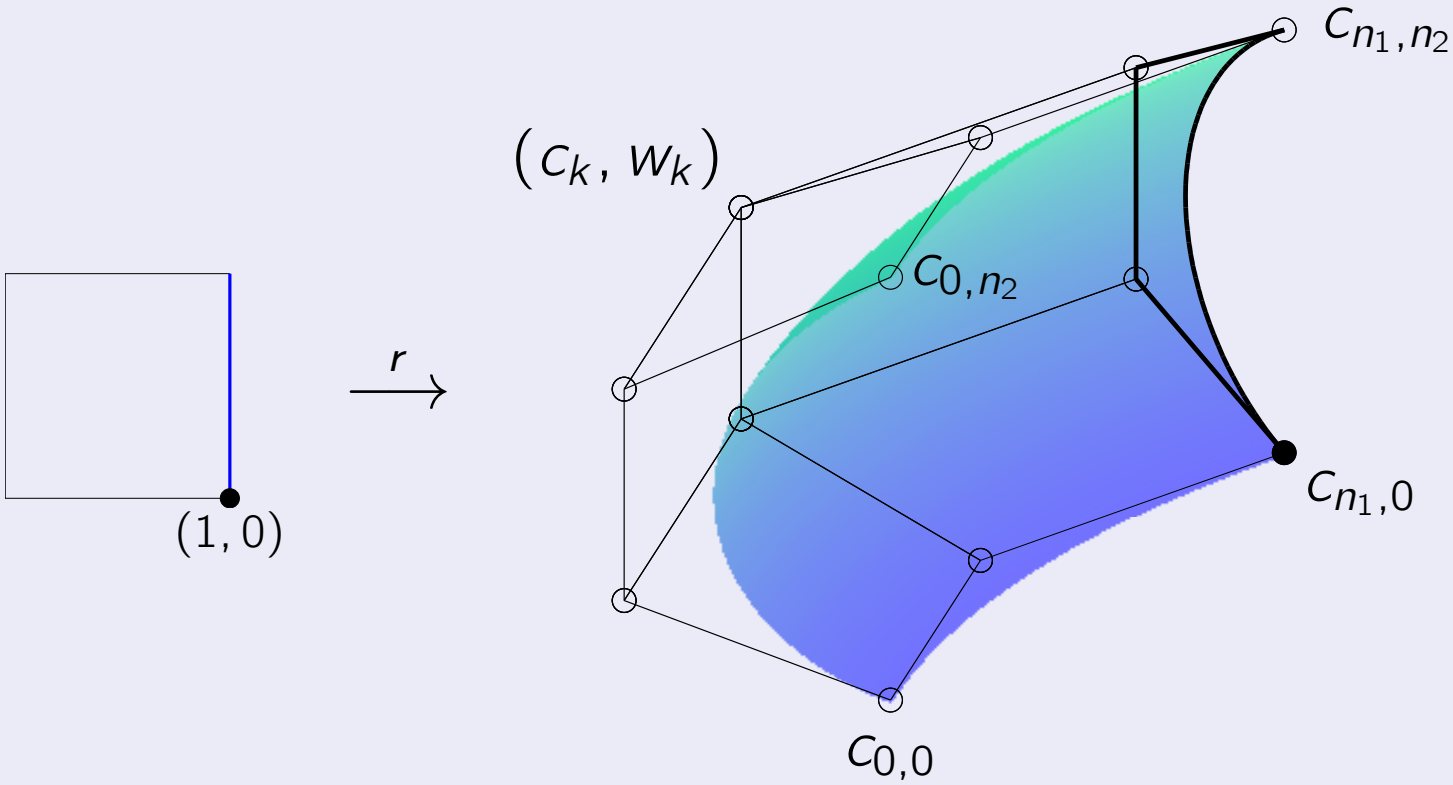
A Bézier patch of coordinate degree $\leq n$ has a parametrization

$$(t_1, t_2) \mapsto (r_1(t), r_2(t), r_3(t)), \quad 0 \leq t_\nu \leq 1\,,$$

in terms of bivariate Bernstein polynomials:

$$r = \frac{\sum_{k_1=0}^{n_1} \sum_{k_2=0}^{n_2} (c_k w_k)\, b_k^n}{\sum_{k_1=0}^{n_1} \sum_{k_2=0}^{n_2} w_k\, b_k^n}, \quad b_k^n(t) = b_{k_1}^{n_1}(t_1) b_{k_2}^{n_2}(t_2)\,,$$

with control points $c_k \in \mathbb{R}^3$ and weights $w_k > 0$.




The control net $C$ qualitatively describes the shape of the surface with additional design flexibility provided by the weights. In particular, the corners of the patch coincide with the control points

$$c_{0,0},\ c_{n_1,0},\ c_{0,n_2},\ c_{n_1,n_2}\ ,$$

and the boundary consists of the four rational Bézier curves corresponding to the boundary polygons of the control net.

## Bézier Surface

A Bézier surface consists of Bézier patches which match along patch boundaries. This means that the corresponding boundary curves have parametrizations with the same control points and weights.