The $n+1$ Bernstein basis polynomials of degree n are defined as

$$b_{v,n}(t) = \binom{n}{v} x^t (1-t)^{n-v}, v = 0, ..., n$$

The coefficients β_v are the Bernstein or Bézier coefficients. A linear combination of Bernstein basis polynomials

$$B_n(t) = \sum_{v=0}^{n} \beta_v b_{v,n}(t)$$

$$\begin{aligned}
&B(t) = 1 \\
&B(t) = (1-t)^2 + 2t(1-t) + t^2 \\
&B(t) = (1-t)^3 + 3t(1-t)^2 + 3t^2(1-t) + t^3 \\
&B(t) = (1-t)^4 + 4t(1-t)^3 + 6t^2(1-t)^3 + 4t^3(1-t) + t^4
\end{aligned}$$

Control Points given as $\{P_1, P_2, P_3, ..., P_{n+1}\}$

Matrix form for Quadratic Bézier curves (degree 2)

$$B(t) = \begin{bmatrix} 1 & t & t^2 \end{bmatrix} \cdot \begin{bmatrix} 1 & 0 & 0 \\ -2 & 2 & 0 \\ 1 & -2 & 1 \end{bmatrix} \cdot \begin{bmatrix} P_1 \\ P_2 \\ P_3 \end{bmatrix}$$

Cubic Bézier curves (degree 3)

$$B(t) = \begin{bmatrix} 1 & t & t^2 & t^3 \end{bmatrix} \cdot \begin{bmatrix} 1 & 0 & 0 & 0 \\ -3 & 3 & 0 & 0 \\ 3 & -6 & 3 & 0 \\ -1 & 3 & -3 & 1 \end{bmatrix} \cdot \begin{bmatrix} P_1 \\ P_2 \\ P_3 \\ P_4 \end{bmatrix}$$

Quartic Bézier curves (degree 4)

$$B(t) = \begin{bmatrix} 1 & t & t^2 & t^3 & t^4 \end{bmatrix} \cdot \begin{bmatrix} 1 & 0 & 0 & 0 & 0 \\ -4 & 4 & 0 & 0 & 0 \\ 6 & -12 & 6 & 0 & 0 \\ -4 & 12 & -12 & 4 & 0 \\ 1 & -4 & 6 & -4 & 1 \end{bmatrix} \cdot \begin{bmatrix} P_1 \\ P_2 \\ P_3 \\ P_4 \\ P_5 \end{bmatrix}$$

Quintic Bézier curves (degree 5)

$$B(t) = \begin{bmatrix} 1 & t & t^2 & t^3 & t^4 & t^5 \end{bmatrix} \cdot \begin{bmatrix} 1 & 0 & 0 & 0 & 0 & 0 \\ -5 & 5 & 0 & 0 & 0 & 0 \\ 10 & -20 & 10 & 0 & 0 & 0 \\ -10 & 30 & -30 & 10 & 0 & 0 \\ 5 & -20 & 30 & -20 & 5 & 0 \\ -1 & 5 & -10 & 10 & -5 & 1 \end{bmatrix} \cdot \begin{bmatrix} P_1 \\ P_2 \\ P_3 \\ P_4 \\ P_5 \\ P_6 \end{bmatrix}$$