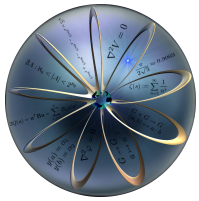

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properties of Bernstein polynomial

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The *Bernstein polynomials* $B_i^n(t)$ have the following properties:

0.1 Non negativity

The polynomials are non-negative over the interval $[0, 1]$.

$$B_i^n(t) \geq 0 \qquad 0 \leq t \leq 1$$

0.2 Symmetry

The set of polynomials of degree n is symmetric with respect to $t = 1/2$.

$$B_i^n(t) = B_{n-i}^n(1-t)$$

0.3 Maximum

Each polynomial has only one maximum over the interval $[0, 1]$ at $t = \frac{i}{n}$.

0.4 Normalization

The set of polynomials of degree n forms a partition of unity.

$$\sum_{i=0}^{n} B_i^n(t) = 1$$

0.5 Degree raising

A polynomial can always be written as a linear combination of polynomials of higher degree.

$$B_i^{n-1}(t) = \frac{n-i}{n} B_i^n(t) + \frac{i+1}{n} B_{i+1}^n(t)$$