

These questions relate to lecture material and aim to highlight the most important concepts. We will cover questions similar to these for our midterm.

In the following questions, assume we have the following control points for interpolated between  $P_0 = (80, 330)^T$  and  $P_1 = (450, 210)^T$

$$B_0 = (80, 330)^T$$

$$B_1 = (70, 180)^T$$

$$B_2 = (260, 80)^T$$

$$B_3 = (450, 210)^T$$

1. Using de Casteljau's algorithm, compute the values of the curve at time  $t = 1$  and  $t = \frac{1}{3}$  using cubic interpolation
2. Compute the value at  $t = \frac{1}{3}$  using the Bernstein form of the cubic interpolation
3. Compute the value at  $t = \frac{1}{3}$  using the matrix form of the cubic interpolation
4. Suppose we use a quadratic polynomial (degree 2) instead of a cubic (degree 3)? What is the Bernstein polynomial for this function to interpolate two points  $p_0$  and  $p_1$ ? How would de Casteljau's algorithm change? What would the matrix form of this interpolation be?