

Computer Graphics

Lecture 24

**Cubic Splines:
Hermite and Bézier**

Announcements

- FP Milestone 1 due tonight
- Grad presentations: next week (MTW)
 - Schedule is on the webpage
 - To encourage attendance: 5 points of "Written Homework" credit for submitting a few-sentence summary of each presentation.
 - Lectures will not be recorded

Notes: Cubic Splines

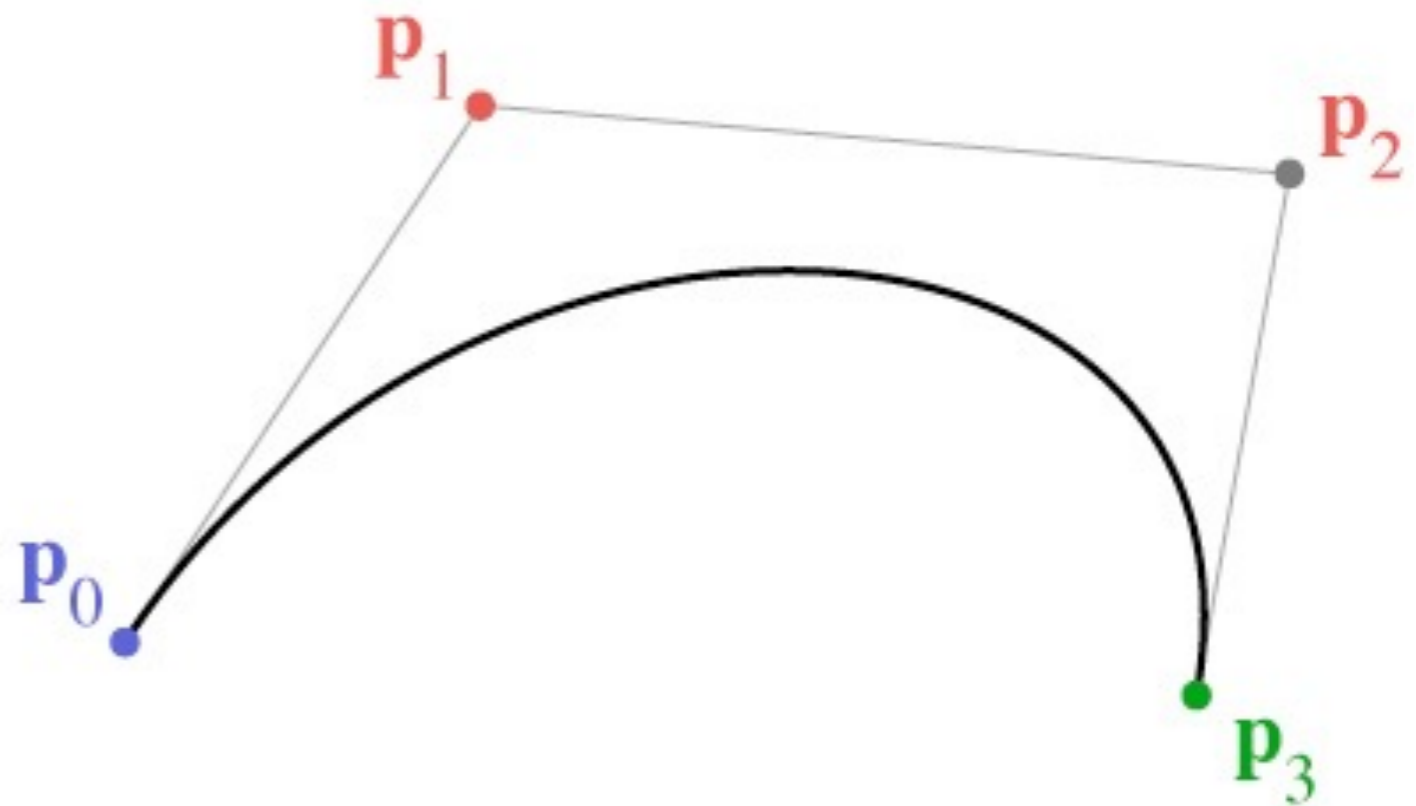
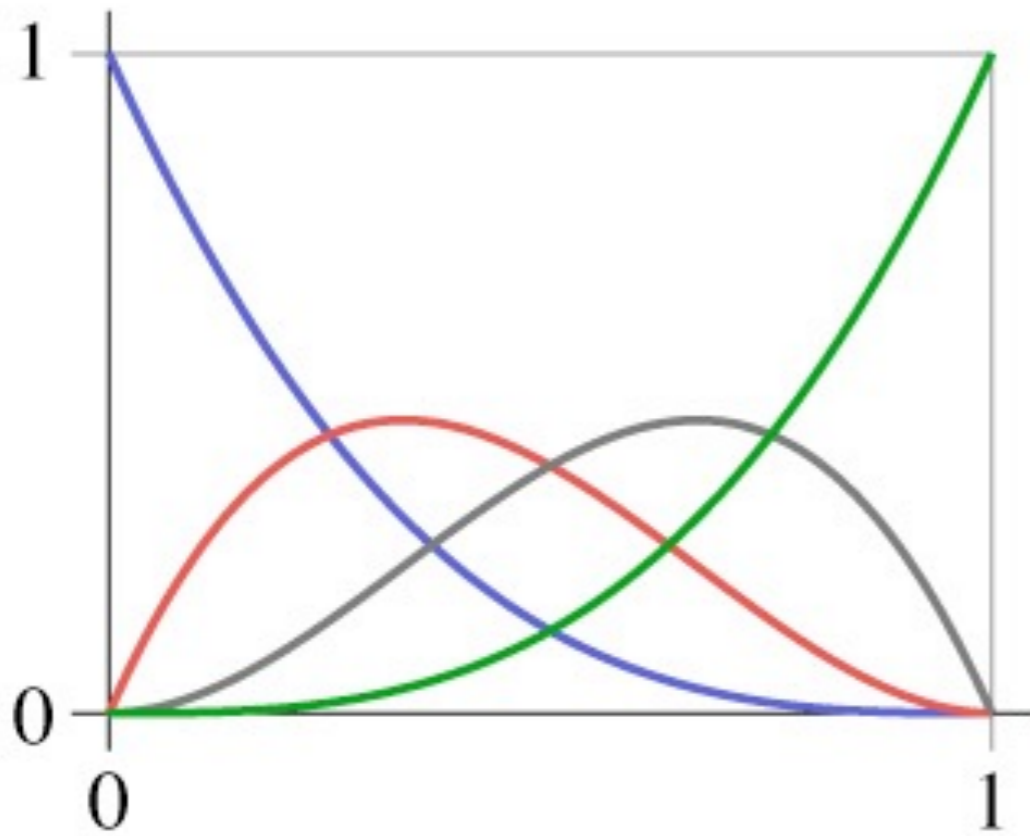
Hermite Splines: Demo

<https://www.desmos.com/calculator/5knm5tkr8m>

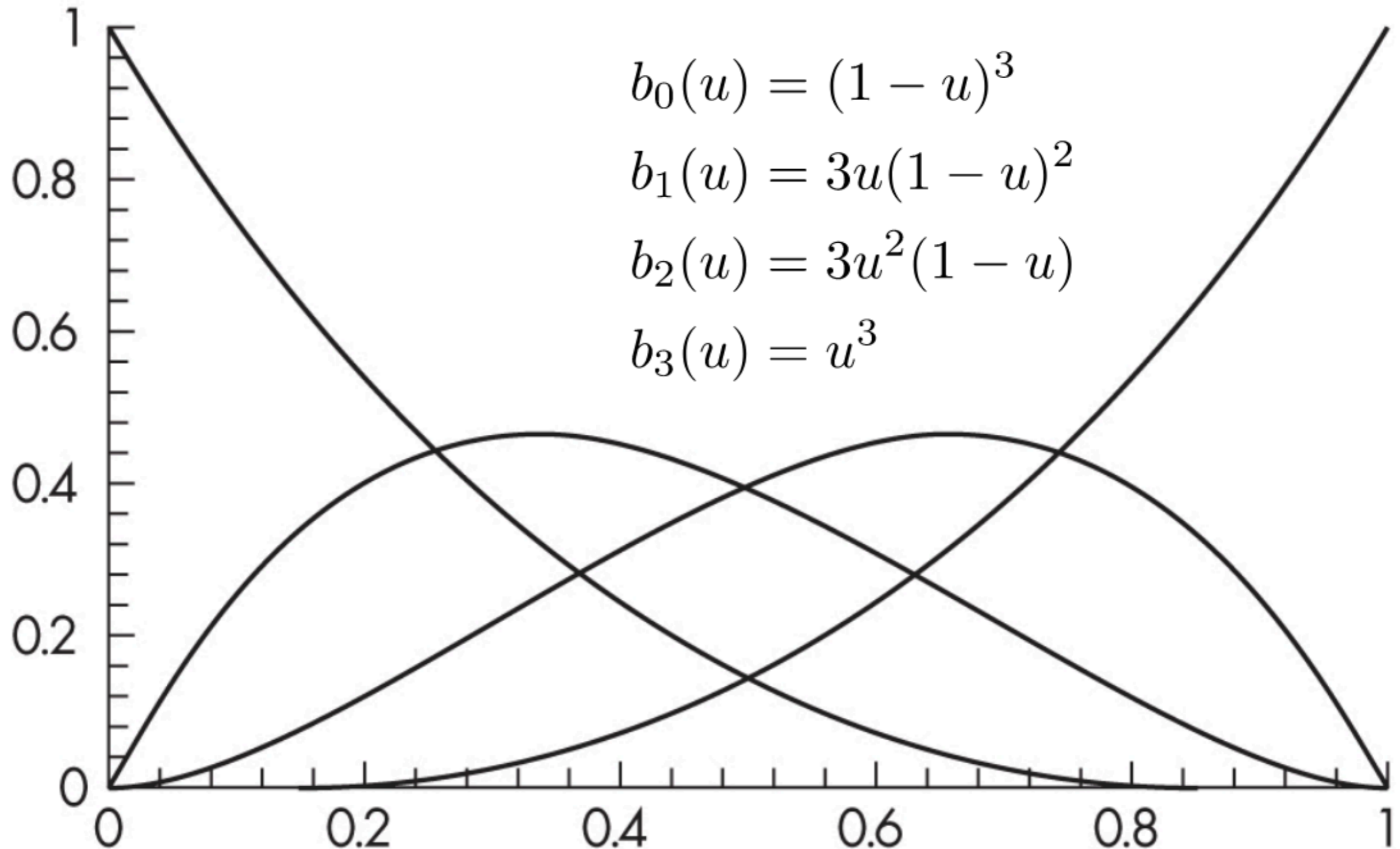
Why is it called a "Basis Matrix"?

- We have: $f(u) = \mathbf{u}^T B \mathbf{p}$
- For computational purposes, we'll want to precompute $B \mathbf{p}$.
 - This is the vector of a_i 's that weights each power of u
- How would we interpret $\mathbf{u}^T B$?
 - A polynomial that specifies the weight on each control point.

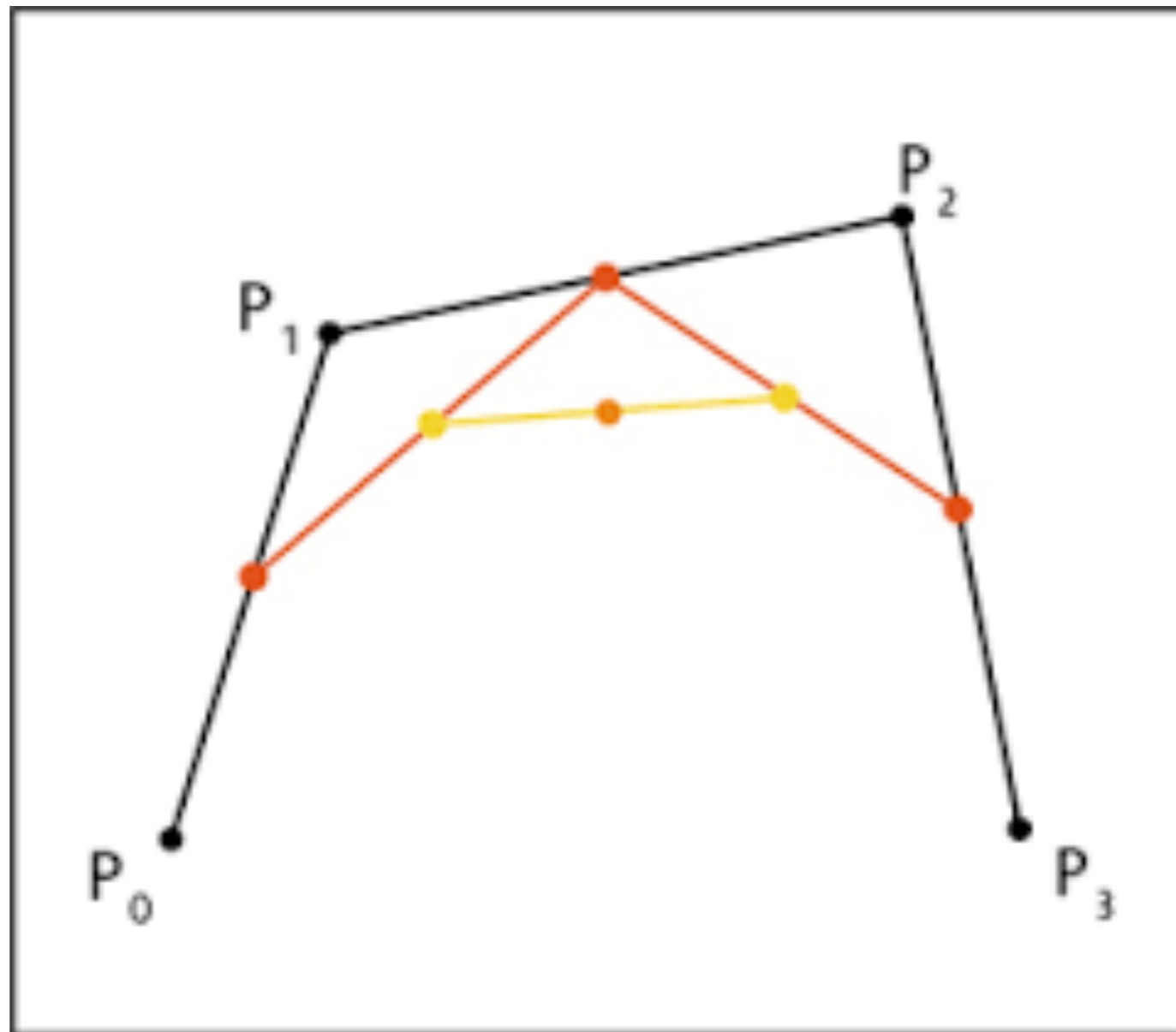
Blending Functions



Cubic Bezier blending functions



Bezier Curves: Geometry



Coollest / most satisfying animation of the quarter

<https://www.jasondavies.com/animated-bezier/>

Drawing via Subdivision

Curves are great, but.

<https://youtu.be/AcFwH161XtM?t=68>

<https://youtu.be/Zkx1aKv2z8o?t=1080>