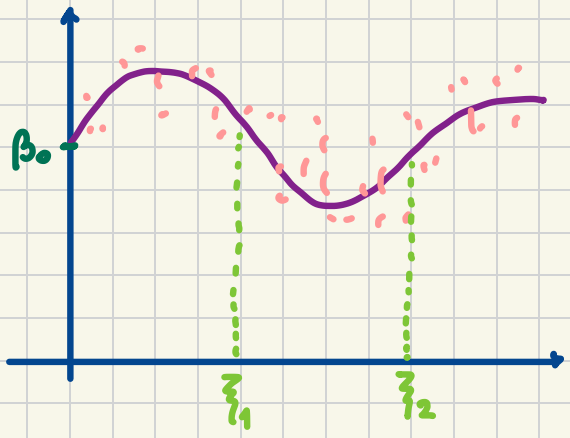
M339G: February 18th, 2026.

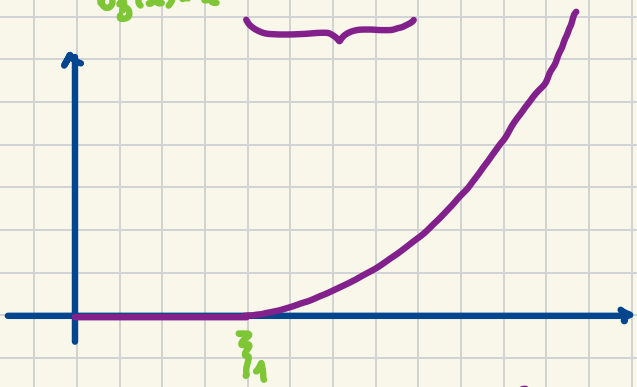
Cubic Splines.



$b_1(x) = x$

$b_2(x) = x^2$

$b_3(x) = x^3$

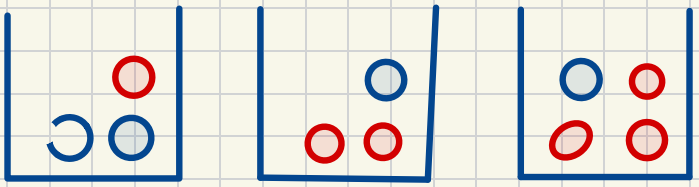


$b_4(x) = (x - \xi_1)^3$

. . .

Inspiration.

Example. Which Box?



$i = 1, 2, 3$

Q: $\mathbb{P}[\text{Box } \#i \mid \text{Red}] =$

$$= \frac{\mathbb{P}[\text{Box } \#i \cap \text{Red}]}{\mathbb{P}[\text{Red}]}$$

Bayes Theorem

$$= \frac{\mathbb{P}[\text{Box } \#i] \cdot \mathbb{P}[\text{Red} \mid \text{Box } \#i]}{\sum_{j=1}^{3} \mathbb{P}[\text{Box } \#j] \cdot \mathbb{P}[\text{Red} \mid \text{Box } \#j]}$$

Making a modeling choice.

$$\mathbb{P}[\text{Box } \#i] = \frac{1}{3}$$

$$\mathbb{P}[\text{Box } \#i] = \frac{\#\text{ marbles in } \#i}{\text{total } \#\text{ marbles}}$$

$$\frac{\frac{1}{3}(\quad)}{\frac{1}{3}(\quad + \quad + \quad)}$$