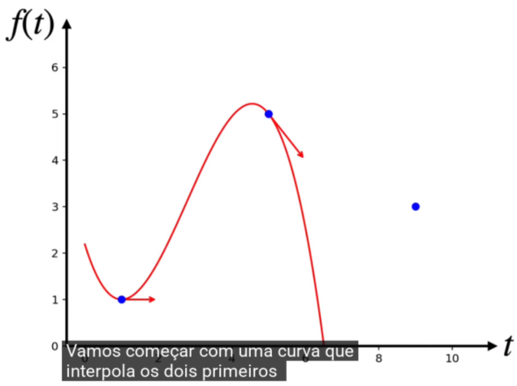
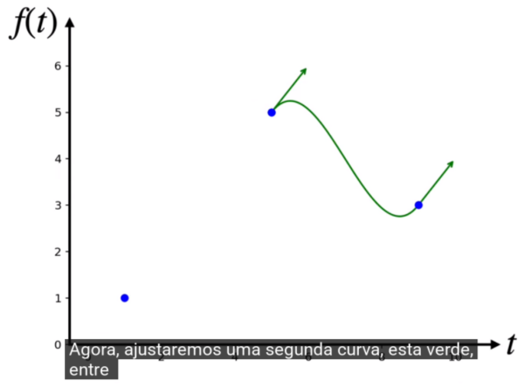
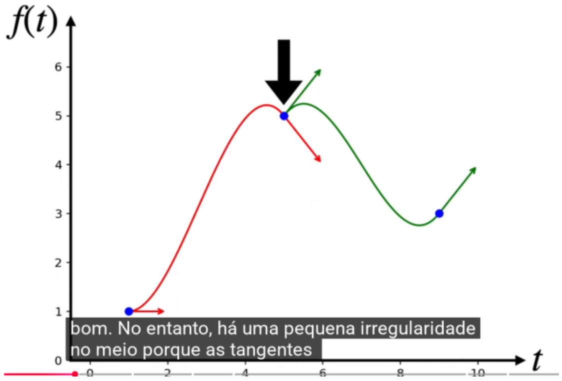
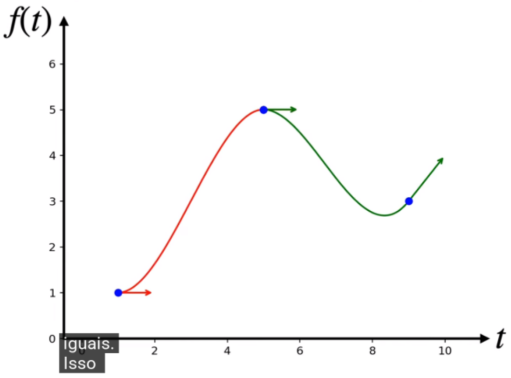
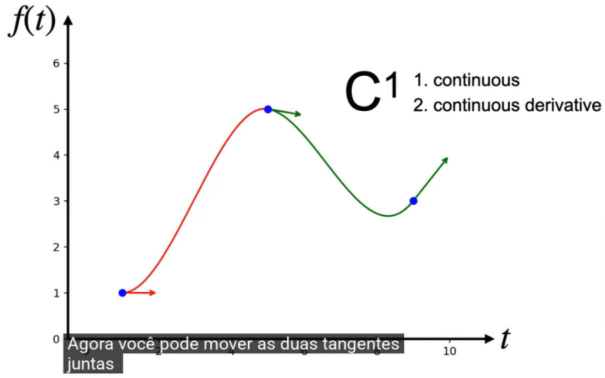
[(2) Splines in 5 Minutes: Part 2 -- Catmull-Rom and Natural Cubic Splines - YouTube]

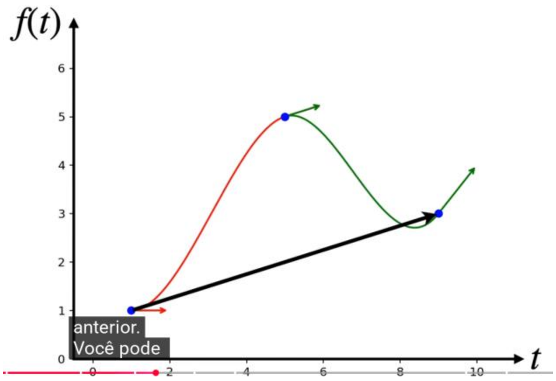


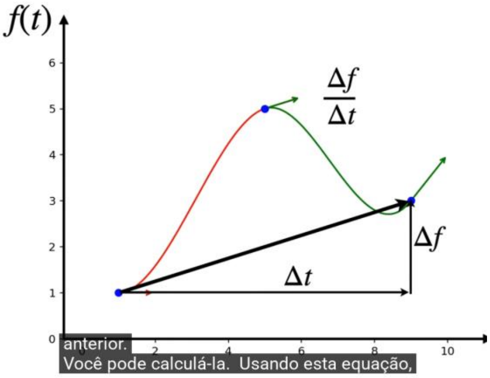








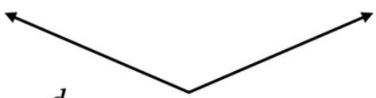




$$\frac{df}{dt} = \frac{df}{dt}$$

$$3k^2a + 2kb + c = 3k^2a + 2kb + c$$

Isso significa que as derivadas são iguais,



$$\frac{d}{dt}(at^3 + bt^2 + ct + d)$$

Você reconhece os lados esquerdo e direito
como as derivadas da equação cúbica

$$3k^2a + 2kb + c - 3k^2a - 2kb - c = 0$$

5 equations

$$\frac{d^2f}{dt^2} = \frac{d^2f}{dt^2}$$

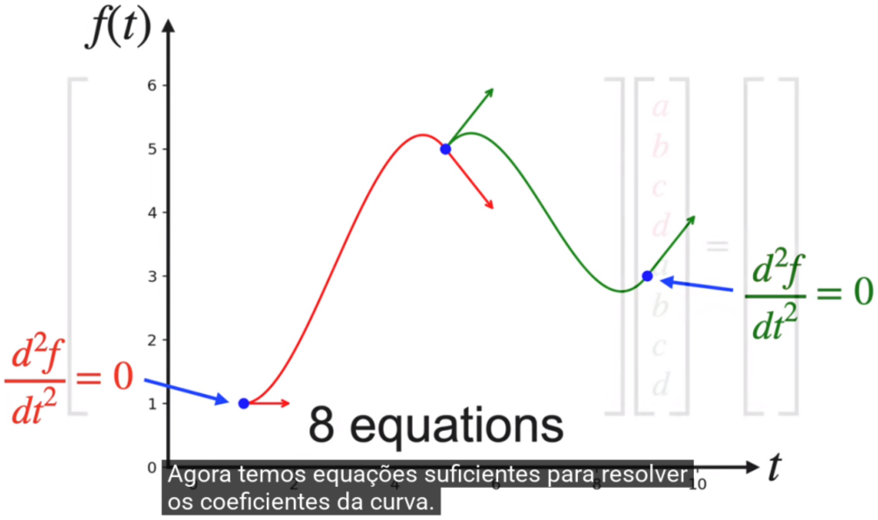
$$6ka + 2b = 6ka + 2b$$

$$\frac{d^2}{dt^2}(at^3 + bt^2 + ct + d)$$

Aqui está a equação para a segunda derivada, que

$$6ka + 2b - 6ka - 2b = 0$$

6 equations



$$\begin{bmatrix} s^3 & s^2 & s & 1 & 0 & 0 & 0 & 0 \\ k^3 & k^2 & k & 1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & k^3 & k^2 & k & 1 \\ 0 & 0 & 0 & 0 & e^3 & e^2 & e & 1 \\ 3k^2 & 2k & 1 & 0 & -3k^2 & -2k & -1 & 0 \\ 6k & 2 & 0 & 0 & -6k & -2 & 0 & 0 \\ 6s & 2 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 6e & 2 & 0 & 0 \end{bmatrix} \begin{bmatrix} a \\ b \\ c \\ d \\ a \\ b \\ c \\ d \end{bmatrix} = \begin{bmatrix} c_s \\ c_k \\ c_k \\ c_e \\ 0 \\ 0 \\ 0 \\ 0 \end{bmatrix}$$

```
s=1
k=5
e=9
sy=1
ky=5
ey=3

b=[sy ky ky ey 0 0 0 0]';

A=[s^3 s^2 s 1 0 0 0 0
   k^3 k^2 k 1 0 0 0 0
   0 0 0 0 k^3 k^2 k 1
   0 0 0 0 e^3 e^2 e 1
   3*k^2 2*k 1 0 -3*k^2 -2*k -1 0
   6*k 2 0 0 -6*k -2 0 0
   6*s 2 0 0 0 0 0 0
   0 0 0 0 6*e 2 0 0]
v=A\b
s1=v(1)*s^3+v(2)*s^2+v(3)*s+v(4)
s1=v(1)*k^3+v(2)*k^2+v(3)*k+v(4)

s2=v(5)*k^3+v(6)*k^2+v(7)*k+v(8)
s2=v(5)*e^3+v(6)*e^2+v(7)*e+v(8)
```