

$a_2(x) := 2 + 3x$

$h := 12$

$n := 6$

$d_0 := 4$

$b_0 := 1$

$\alpha := 0$

$b_1(x) := \cos(x - 1) - 1$

$b_2(x) := \sin(x - 1)$

$b_3(x) := \cos[2 \cdot (x - 1)] - 1$

$b_4(x) := \sin[2 \cdot (x - 1)]$

$b_5(x) := \cos[3 \cdot (x - 1)] - 1$

$b_6(x) := \sin[3 \cdot (x - 1)]$

$$K_{11} := \int_0^1 \left(\frac{d}{dx} b_1(x) \right) \cdot a_2(x) \cdot \left(\frac{d}{dx} b_1(x) \right) dx \quad K_{22} := \int_0^1 \left(\frac{d}{dx} b_2(x) \right) \cdot a_2(x) \cdot \left(\frac{d}{dx} b_2(x) \right) dx \quad K_{33} := \int_0^1 \left(\frac{d}{dx} b_3(x) \right) \cdot a_2(x) \cdot \left(\frac{d}{dx} b_3(x) \right) dx \quad K_{44} := \int_0^1 \left(\frac{d}{dx} b_4(x) \right) \cdot a_2(x) \cdot \left(\frac{d}{dx} b_4(x) \right) dx$$

$$K_{12} := \int_0^1 \left(\frac{d}{dx} b_1(x) \right) \cdot a_2(x) \cdot \left(\frac{d}{dx} b_2(x) \right) dx \quad K_{23} := \int_0^1 \left(\frac{d}{dx} b_2(x) \right) \cdot a_2(x) \cdot \left(\frac{d}{dx} b_3(x) \right) dx \quad K_{34} := \int_0^1 \left(\frac{d}{dx} b_3(x) \right) \cdot a_2(x) \cdot \left(\frac{d}{dx} b_4(x) \right) dx \quad K_{45} := \int_0^1 \left(\frac{d}{dx} b_4(x) \right) \cdot a_2(x) \cdot \left(\frac{d}{dx} b_5(x) \right) dx$$

$$K_{13} := \int_0^1 \left(\frac{d}{dx} b_1(x) \right) \cdot a_2(x) \cdot \left(\frac{d}{dx} b_3(x) \right) dx \quad K_{24} := \int_0^1 \left(\frac{d}{dx} b_2(x) \right) \cdot a_2(x) \cdot \left(\frac{d}{dx} b_4(x) \right) dx \quad K_{35} := \int_0^1 \left(\frac{d}{dx} b_3(x) \right) \cdot a_2(x) \cdot \left(\frac{d}{dx} b_5(x) \right) dx \quad K_{46} := \int_0^1 \left(\frac{d}{dx} b_4(x) \right) \cdot a_2(x) \cdot \left(\frac{d}{dx} b_6(x) \right) dx$$

$$K_{14} := \int_0^1 \left(\frac{d}{dx} b_1(x) \right) \cdot a_2(x) \cdot \left(\frac{d}{dx} b_4(x) \right) dx \quad K_{25} := \int_0^1 \left(\frac{d}{dx} b_2(x) \right) \cdot a_2(x) \cdot \left(\frac{d}{dx} b_5(x) \right) dx \quad K_{36} := \int_0^1 \left(\frac{d}{dx} b_3(x) \right) \cdot a_2(x) \cdot \left(\frac{d}{dx} b_6(x) \right) dx \quad K_{55} := \int_0^1 \left(\frac{d}{dx} b_5(x) \right) \cdot a_2(x) \cdot \left(\frac{d}{dx} b_5(x) \right) dx$$

$$K_{15} := \int_0^1 \left(\frac{d}{dx} b_1(x) \right) \cdot a_2(x) \cdot \left(\frac{d}{dx} b_5(x) \right) dx \quad K_{26} := \int_0^1 \left(\frac{d}{dx} b_2(x) \right) \cdot a_2(x) \cdot \left(\frac{d}{dx} b_6(x) \right) dx \quad K_{56} := \int_0^1 \left(\frac{d}{dx} b_5(x) \right) \cdot a_2(x) \cdot \left(\frac{d}{dx} b_6(x) \right) dx \quad K_{66} := \int_0^1 \left(\frac{d}{dx} b_6(x) \right) \cdot a_2(x) \cdot \left(\frac{d}{dx} b_6(x) \right) dx$$

$$K_{16} := \int_0^1 \left(\frac{d}{dx} b_1(x) \right) \cdot a_2(x) \cdot \left(\frac{d}{dx} b_6(x) \right) dx$$

$$K_{FF} := \begin{pmatrix} K_{11} & K_{12} & K_{13} & K_{14} & K_{15} & K_{16} \\ K_{12} & K_{22} & K_{23} & K_{24} & K_{25} & K_{26} \\ K_{13} & K_{23} & K_{33} & K_{34} & K_{35} & K_{36} \\ K_{14} & K_{24} & K_{34} & K_{44} & K_{45} & K_{46} \\ K_{15} & K_{25} & K_{35} & K_{45} & K_{55} & K_{56} \\ K_{16} & K_{26} & K_{36} & K_{46} & K_{56} & K_{66} \end{pmatrix}$$

$$K_{FF} = \begin{pmatrix} 0.764 & 1.117 & 2.305 & 0.885 & 3.06 & -0.773 \\ 1.117 & 2.736 & 3.675 & 3.819 & 5.929 & 2.855 \\ 2.305 & 3.675 & 7.137 & 3.437 & 10.079 & -1.18 \\ 0.885 & 3.819 & 3.437 & 6.863 & 7.19 & 8.293 \\ 3.06 & 5.929 & 10.079 & 7.19 & 16.154 & 2.415 \\ -0.773 & 2.855 & -1.18 & 8.293 & 2.415 & 15.346 \end{pmatrix}$$

$$FF_1 := b_1(\alpha) \cdot h + \int_0^1 b_1(x) \cdot 5x \, dx \quad FF_2 := b_2(\alpha) \cdot h + \int_0^1 b_2(x) \cdot 5x \, dx \quad FF_3 := b_3(\alpha) \cdot h + \int_0^1 b_3(x) \cdot 5x \, dx \quad FF_4 := b_4(\alpha) \cdot h + \int_0^1 b_4(x) \cdot 5x \, dx$$

$$FF_5 := b_5(\alpha) \cdot h + \int_0^1 b_5(x) \cdot 5x \, dx \quad FF_6 := b_6(\alpha) \cdot h + \int_0^1 b_6(x) \cdot 5x \, dx$$

$$F_F := (FF_1 \ FF_2 \ FF_3 \ FF_4 \ FF_5 \ FF_6)^T$$

$$d_F := K_{FF}^{-1} \cdot F_F$$

$$F_F = \begin{pmatrix} -5.718 \\ -10.89 \\ -17.724 \\ -12.275 \\ -25.274 \\ -3.282 \end{pmatrix} \quad d_F = \begin{pmatrix} -26.379 \\ 1.214 \\ 8.796 \\ -3.542 \\ -1.074 \\ 0.991 \end{pmatrix}$$

$$u_h(x) := d_0 \cdot b_0 + d_{F_1} \cdot b_1(x) + d_{F_2} \cdot b_2(x) + d_{F_3} \cdot b_3(x) + d_{F_4} \cdot b_4(x) + d_{F_5} \cdot b_5(x) + d_{F_6} \cdot b_6(x)$$

