

Excercise 6

We have the Octave (MATLABa) NNTrain.m functions that trains the simple neural network to find a coefficients u_1, u_2, u_3 of B-splines $B_1(x)=(1-x)^2$, $B_2(x)= 2x(1-x)$, $B_3(x)=x^2$ which approximate a function $\sin(n \cdot \pi \cdot x)$

$$u_1 \cdot (1-x)^2 + u_2 \cdot (1-x)^2 x + u_3 \cdot x^2 \approx \sin(n \cdot \pi \cdot x)$$

$$u_1 \approx c_1 \sigma(a_1 n + b_1) + d_1$$

$$u_2 \approx c_2 \sigma(a_2 n + b_2) + d_2$$

$$u_3 \approx c_3 \sigma(a_3 x + b_3) + d_3$$

where $\sigma(x)$ is the non-linear sigmoid function

The procedure finds parameters

$a_1, b_1, c_1; a_2, b_2, c_2; a_3, b_3, c_3$; starting from

$a_1=1, b_1=1, c_1=1, a_2=1, b_2=1, c_2=1, a_3=1, b_3=1, c_3=1$

This does not converge for u_2 and $u_3 \rightarrow$

Please find the starting values for coefficients

$a_2=?$, $b_2=?$, $c_2=?$, $a_3=?$, $b_3=?$, $c_3=?$ so the training converges

