Text

Description automatically generated

tval=[1 1.01 1.02 1.03 1.04];

current=[3.01 3.12 3.14 3.18 3.24];

MidPt=@(ph,mh,h) (1/(2\*h))\*[current(ph)-current(mh)];

OneSide=@(loc,ph,p2h,h) (1/(2\*h))\*[-3\*current(loc) +4\*current(ph)-current(p2h)];

%t=1, only info to the right, so use one-sided formula with h=0.01

DerivAt1=OneSide(1,2,3,0.01);

%t=1.01, have info to left and right, since midpoint has h^2/6, it has

%lower error than one-sided

DerivAt1pt01=MidPt(3,1,0.01);

DerivAt1pt02=MidPt(4,2,0.01);

DerivAt1pt03=MidPt(5,3,0.01);

%x=0, only info to the left, so use one-sided formula with h=-0.1

DerivAt1pt04=OneSide(5,4,3,-0.01);

DerivApprox=[DerivAt1 DerivAt1pt01 DerivAt1pt02 DerivAt1pt03 DerivAt1pt04]

L=0.98;

R=0.142;

Voltage=L\*DerivApprox+R\*current

Matlab Output:

DerivApprox = 15.5000 6.5000 3.0000 5.0000 7.0000

Voltage = 15.6174 6.8130 3.3859 5.3516 7.3201

B: In the code, an O(h^2) accurate derivative approximation was used. At t=1, it was a forward approximation since using points to the right. For t=1.01, 1.02, and 1.03, a centered or midpoint approximation was used. At t=1.04, a backward approximation was used since time values beyond 1.04 are not known.

Text, letter

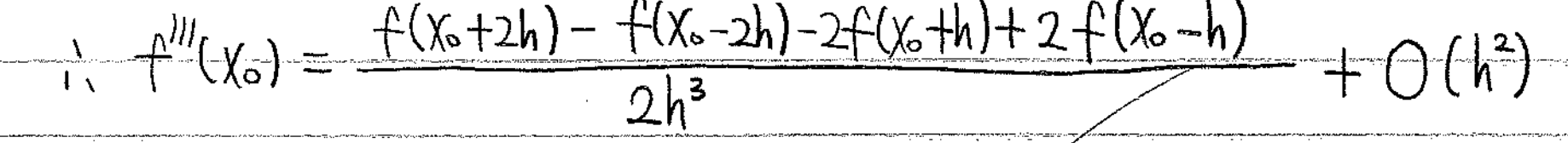
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