**13ELP002 - MATLAB**

Exercise 6: Simple differentiation

Obtain the function , where *t* is in seconds (s), over the range 0 ≤ *t* ≤ 2s, with a sample time of 0.01s. We did this in Ex1.

(i) Differentiate this mathematically to obtain dx/dt.

(ii) Investigate the MATLAB *diff* command and use it to find a numerical approximation to dx/dt.

Exercise 7: Simple integration

Obtain the function , where *t* is in seconds (s), over the range 0 ≤ *t* ≤ 2s, with a sample time of 0.01s.

(i) Integrate this mathematically to obtain. over this time range.

(ii) Investigate the MATLAB *cumsum* command and use it to find a numerical approximation to .

Exercise 8: Differential equations

Solve the differential equations using numerical methods.

(i)

(ii)