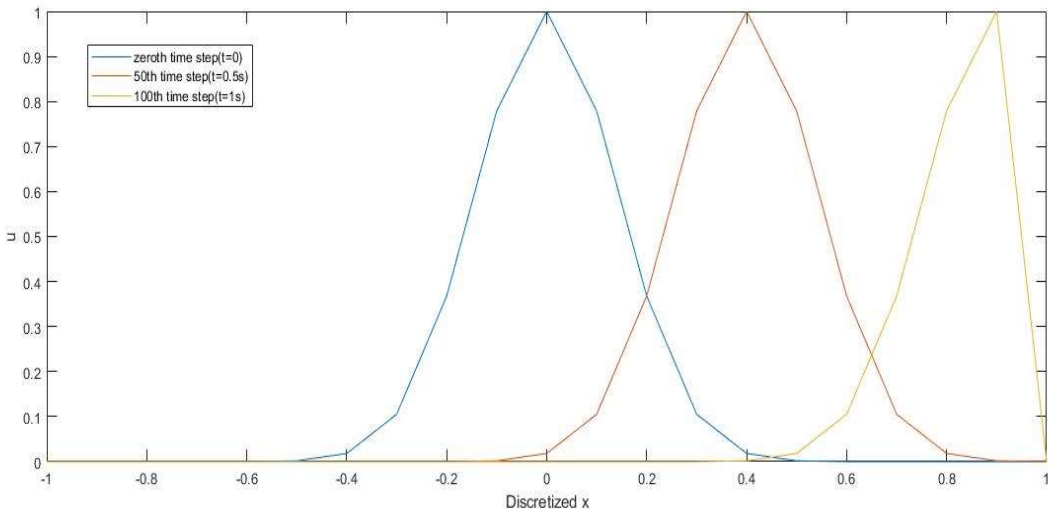
Midterm 1: Plots for Q2 to Q5

Q2)

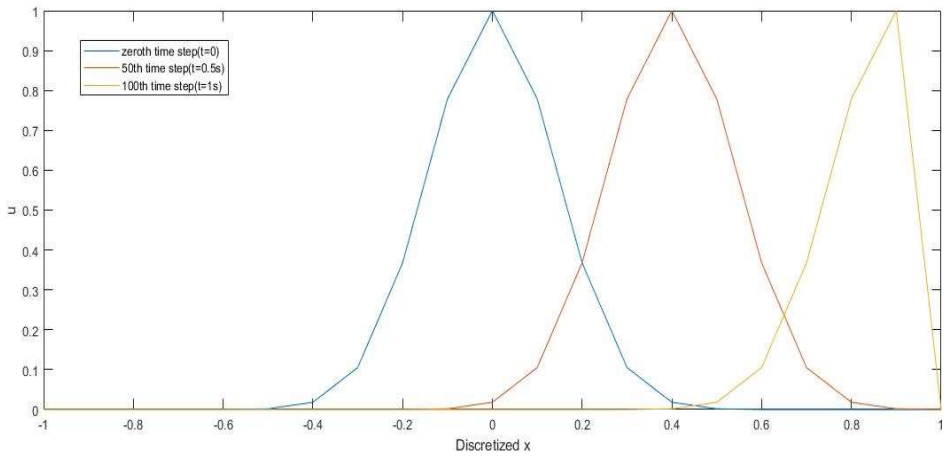
Upwind scheme plot



We observe that as the time step increases the ‘u’ keeps moving over discretized x without any change in shape. Curve remained not so smooth because the ‘dt’ considered is a not so small. If a smaller dt is considered then peak height of curve is expected to reduce with increase in time step.

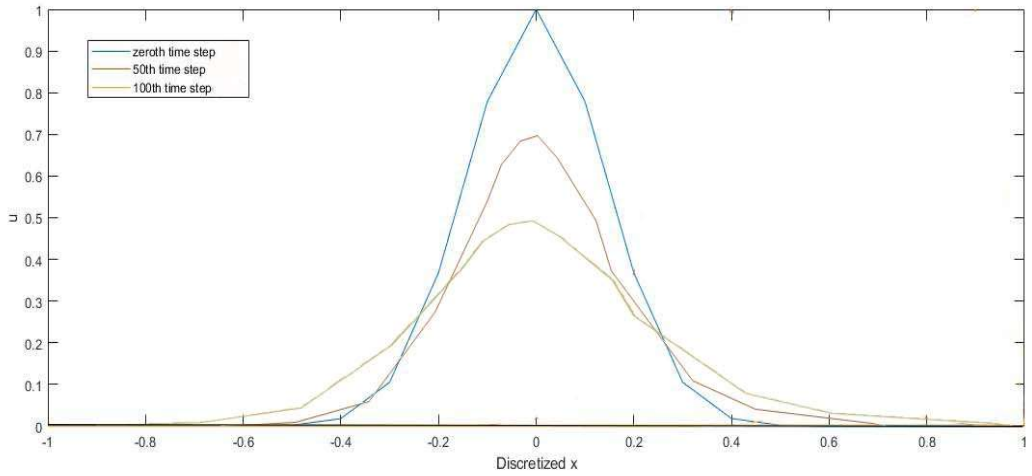
Q3)

Lax-Wendroff plot



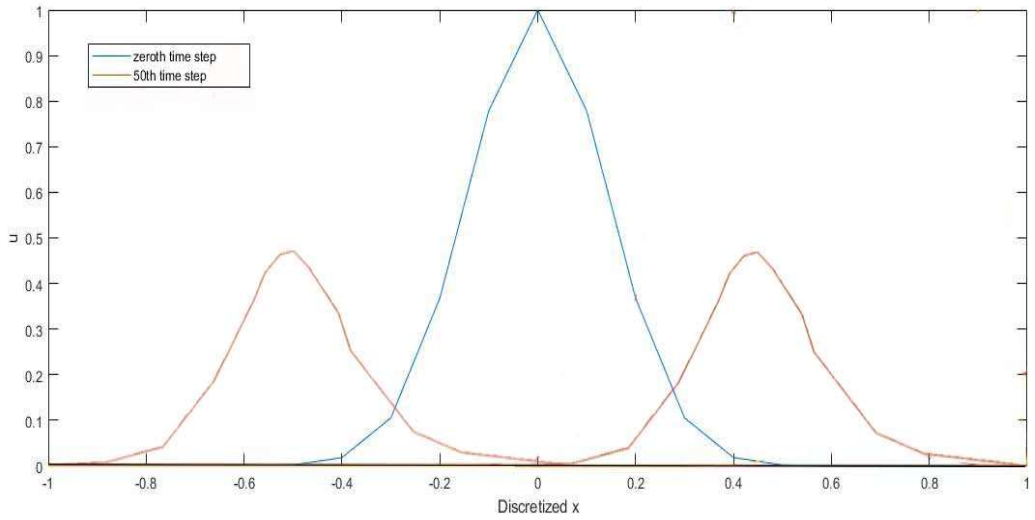
We observe that as the time step increases the ‘u’ keeps moving over discretized x without any change in shape. Curve remained not so smooth because the ‘dt’ considered is a not so small. The difference between Lax-Wendroff and upwind is that peak of the curve remains unaltered with increasing time step in Lax-Wendroff.

Q4)



It is noticed that peak of the curve keeps declining and spread keeps increasing as the time step increases.

Q5)



The wave is expected to reflect at the boundaries. Reflected curve is not shown due to problems encountered in exporting values for plotting. Also a smoother plot can be obtained if size of ‘dt’ is reduced further.