Dear All,

The treatment for obtaining consistent analytical plot is very easy. The method is as follows:

1. Choose the $\Delta t = \frac{\Delta x}{u}$, as this will maintain Courant no =1. This implies that you do not have to change anything in analytical solution any time.
2. While, plotting you have to ensure that both analytical and numerical solution are plotted at identical times.
3. Let us take the example of Upwind Scheme
4. We already got the problem solved for C = 1 by choosing $\Delta t = 0.2$ for both cases and the values plotted at t = 2.4 s. Both plots were identical
5. Now let us compare the numerical and analytical solution when Δt, for numerical 0.1. This will make C for numerical = 0.5. The last row will read t = 1.2 s as we have cut the time stel by half.
6. The numerical solution would have shifted in the graph as the time axis has not been changed.
7. For plotting the analytical solution we just have to choose the row that t = 1.2 s.
8. **It is that simple.**
9. Finally, to preserve the plot, convert into an image. Nowproceed for Δt, for numerical to be 0.05 for C = 0.25, and subsequently Δt, for numerical to be 0.15 for C = 0.75.
10. Note that analytical solution remains the same. Only care to be taken is that for C = 0.25, plot numerical and analytical at 0.6 s and for C = 0.75, plot at 1.8 s.
11. Now experience the numerical diffusion in all schemes, viz., Lax and Lax-Wendroff.