

Computing Project 3 (50 points)

Due date: Tuesday 8 July

Apply the Kurganov-Tadmor MUSCL scheme with the van Al bada flux limiter to the problem

$$\begin{aligned}u_t + uu_x &= 0 \\u(0, t) &= 0 \\u(x, 0) &= \exp(-100(x - .3)^2)\end{aligned}$$

for $x \in (0, 1)$ and $0 \leq t \leq 0.2$. Use the condition $u_{xx} = 0$ for the right boundary. Use $dx = 1d - 3$ and $dt = 1d - 5$. Use Lax-Friedrichs at $i = 2$ and $i = n - 1$. Create a plot showing the initial condition and solution at the 20%, 40%, 60%, 80% and 100% marks. Use the format from SAMPLE2.f at the beginning of the semester, letting $np = (M-1)/5$, where M is the total number of time steps.