Lund University, Numerical Analysis **Spring Term 2, 2019**
Philipp Birken

Finite Volume Methods

Assignment 6

Problem 1
Consider the DG method with Π_1 basis functions for the linear advection equation. Write down the discretization for the upwind flux for a fixed mesh width Δx when using the monomial basis.

Problem 2
Consider the linear advection equation

$$u_t + u_x = 0, \quad x \in [0, 2], t \in [0, \infty].$$

Discretize this using the explicit Euler method with constant mesh width Δt in time and the second order DG method when using the monomial basis with constant mesh width Δx in space. As a flux function, use the upwind flux.

Use the following test examples:

a) $u(x, 0) = \sin x, u(0, t) = -\sin t$

Return: Thursday, May 16th, in class