

Set 3 - CUDA

Issued: December 22, 2022

Question 1: Diffusion on GPUs

In this exercise we will port the well known 2D diffusion using stencils on GPUs.

Implement a kernel for the propagation using only global memory. A serial CPU C++ code is provided in `diffusion2d_serial.cpp`. Moreover, we provide in `diffusion2d_cuda.cu` an incomplete CUDA implementation. The function `PropagateDensity()` should call the CUDA kernel instead of doing the computation. Complete the missing parts (with TODO) and check your results with those produced by the serial code. Moreover, compare and report the achieved speed compared to the given serial code, for system size 2^{10} and 2^{11} .

Hint: `threadIdx` and `BlockIdx` offer more than one dimension.