

## 1 Question 1: 2D Diffusion using Particle Strength Exchange (PSE)

### 1.1 a)

Done as instructed.

### 1.2 b)

Done as instructed and submitted.

### 1.3 c)

Done as instructed and submitted.

### 1.4 d)

Given  $N$  particles distributed random-uniformly on a 2D domain  $[0, 1)^2$ , the distance between particles in each direction can be estimated as  $h \simeq \frac{1}{\sqrt{N}}$ .

Running the experiment with kernel spreads  $\varepsilon$  much larger or much smaller than  $h$  leads to negligible exchange between particles over the same given timeframe:

- If  $\varepsilon \ll h$ , any neighbours are likely outside a kernel's width.
- If  $\varepsilon \gg h$ , a large amount of neighbours fall within the width of a kernel.

On the other hand, running the experiment with  $\varepsilon \simeq h$  yields the expected 'text book' result.