S12 - HPC

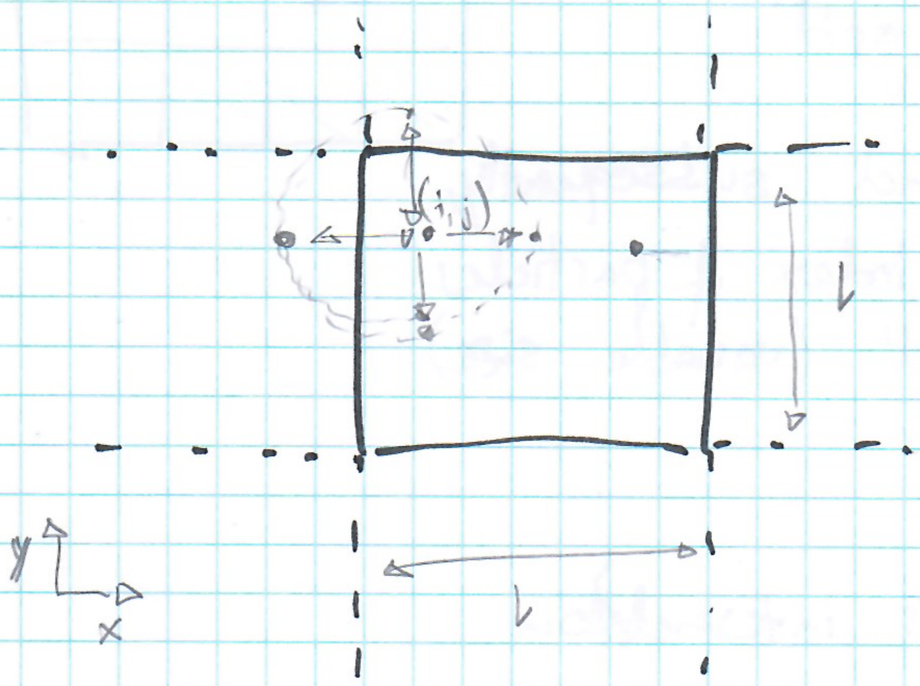
1) field $\phi(x,y,t)$
domain $(x,y) \in [0,1)^2$

$$\frac{\partial \phi}{\partial t} = \nu \left(\frac{\partial^2 \phi}{\partial x^2} + \frac{\partial^2 \phi}{\partial y^2} \right)$$

particle: $\vec{x}_i$, $\phi_i(t)$, $V_i = 1/N$

$$\frac{d\phi_i}{dt} = \frac{\nu}{\varepsilon^2} \sum_j V_j (\phi_j - \phi_i) \eta_\varepsilon (x_j - x_i)$$

$$\eta_\varepsilon(r) = \frac{1}{\varepsilon^2} \eta\left(\frac{\vec{r}}{\varepsilon}\right), \quad \eta(\vec{r}) = \frac{4}{\pi} e^{-|\vec{r}|^2}$$



- need distance from of particles

loop over x
  check distance
  store possible neighbor idx

loop over y ~~for~~ possible neigh. ~~>~~ or over y
  check distance
  store idx

distance $x[i] - x[j]$

~~$(1 - x[j]) + x[i]$~~ $1 - (x[i] - x[j])$

intersection of lists/arrays