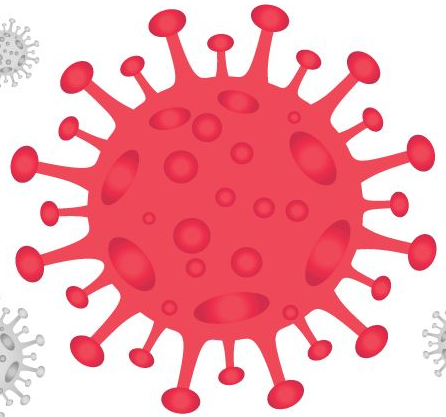
COVID-19 DEVELOPMENT MODEL



- **PREPARED BY:**

DEVELOPERS:

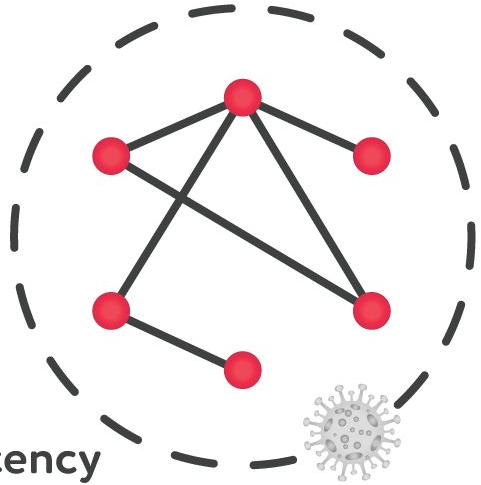
Yaroslav Morozevych • Yana Muliarska • Andriy Turko

MENTORS:

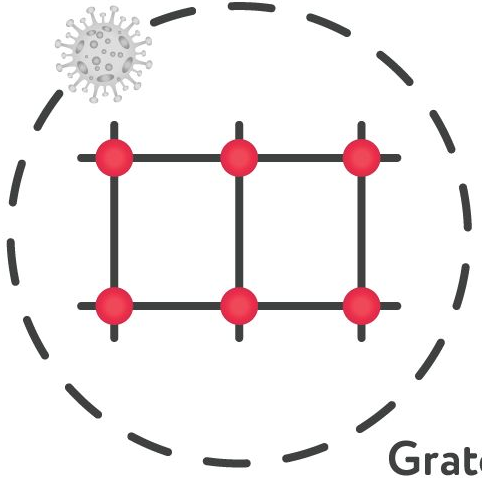
Viktoriia Blavatska • Yaroslav Ilnytskyi

Doctors of Sciences in Physical and Mathematical Sciences,
Institute for Condensed Matter Physics of the
National Academy of Sciences of Ukraine

- KINDS OF MODEL IMPLEMENTATION

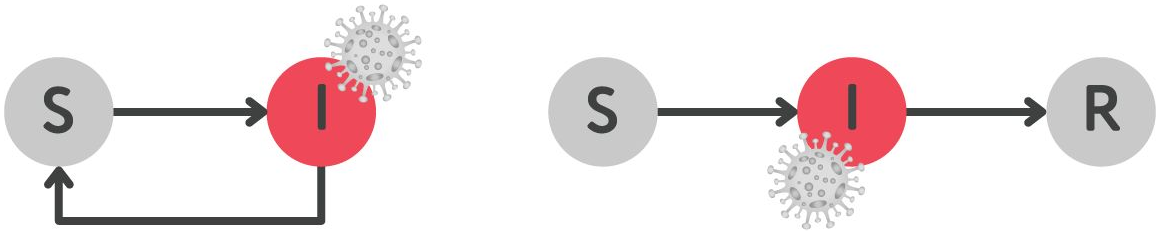


Adjacency Matrix



Grate

- SIS & SIR IMPLEMENTATION



S - Suspectible • I - Infected • R - Recovered

- SIS & SIR TESTING. COMPARING (R)

(R) - Reproductive Number

$$(R) = \frac{\text{Beta}}{\text{Gamma}}$$

– Calculating Gamma:

$$(R)_{SIS} = \frac{1}{c(N - 2) + 1}$$

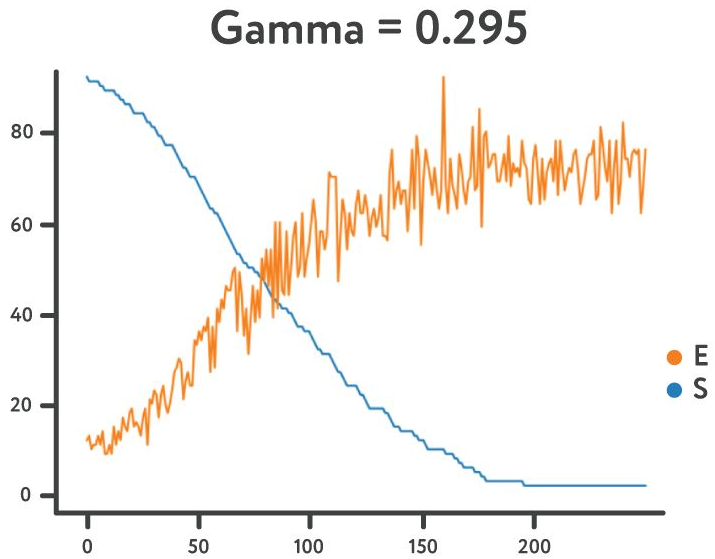
$$(R)_{SIR} = \frac{1}{c(N - 2)}$$

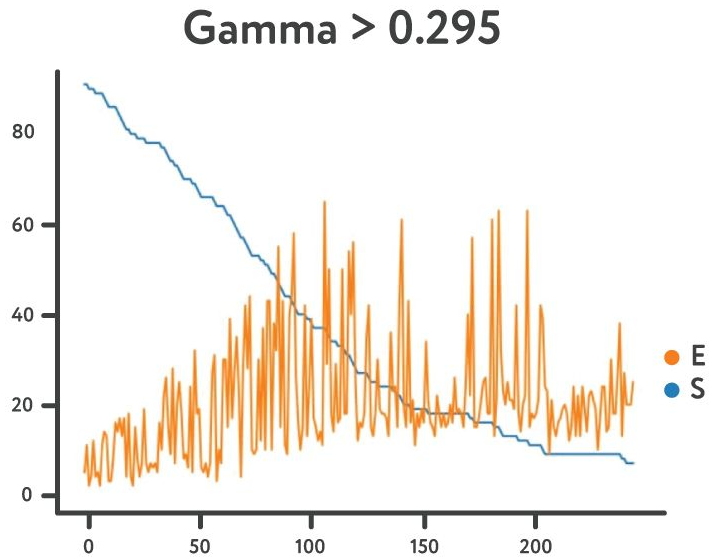
For Beta = 0.05

Gamma = 0.295

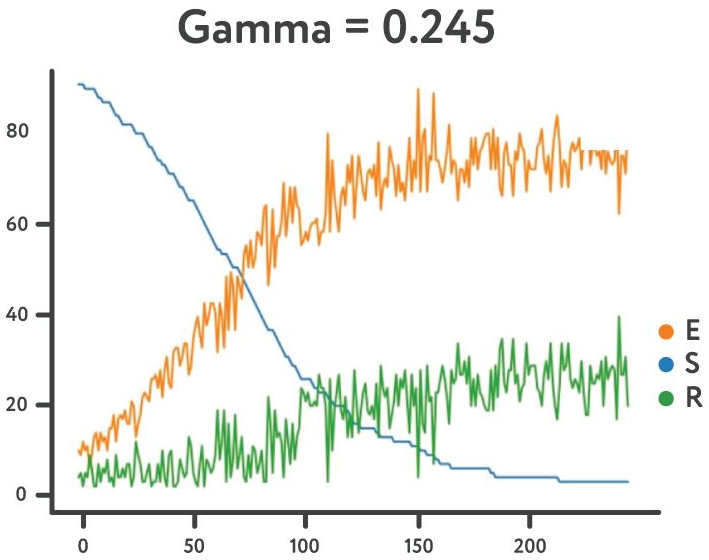
Gamma = 0.245

- **RESULTS FOR SIS**





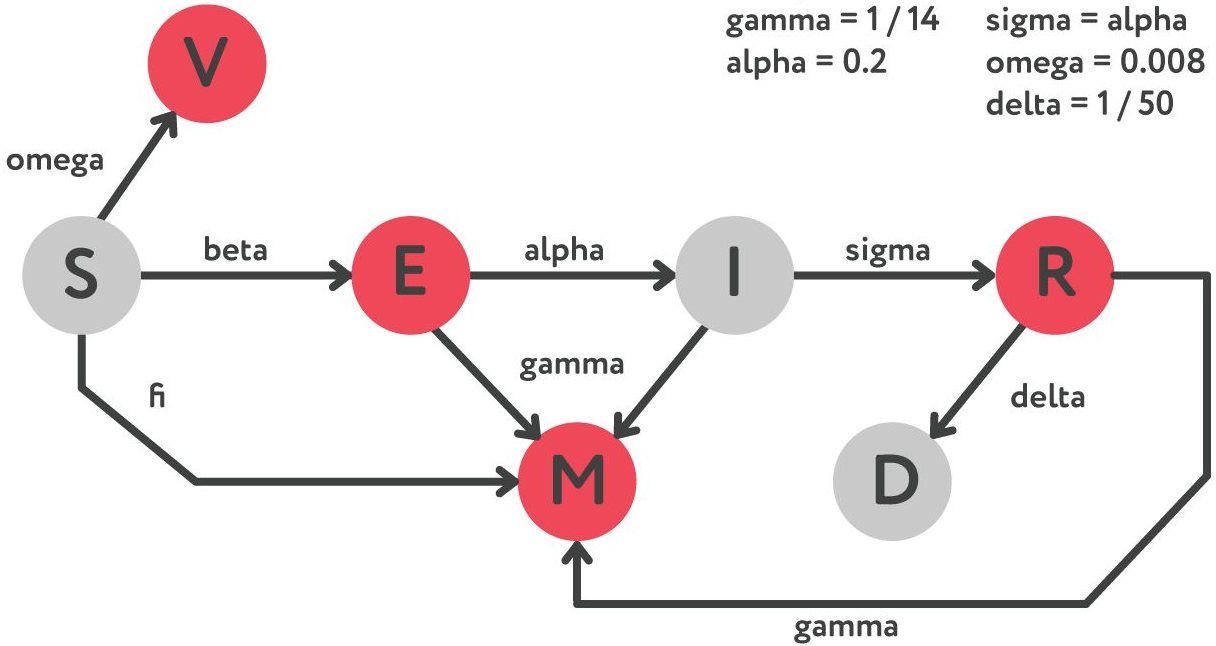
- **RESULTS FOR SIR**



- WHAT IS SEIRVDM?

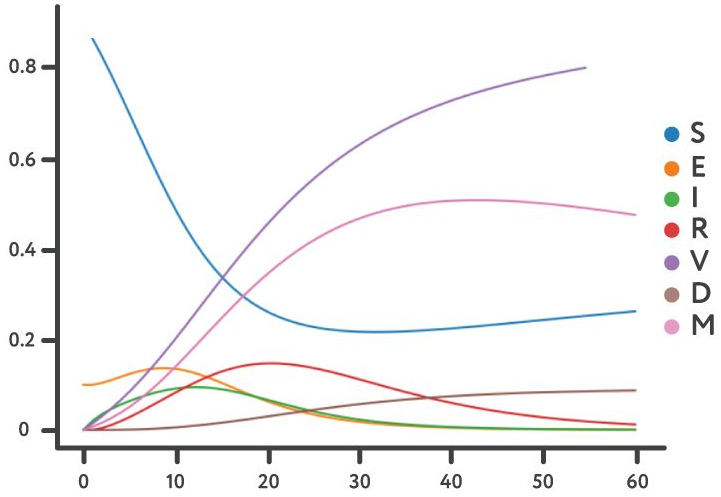
fi = 1 / 120
gamma = 1 / 14
alpha = 0.2

beta = 0.3
sigma = alpha
omega = 0.008
delta = 1 / 50

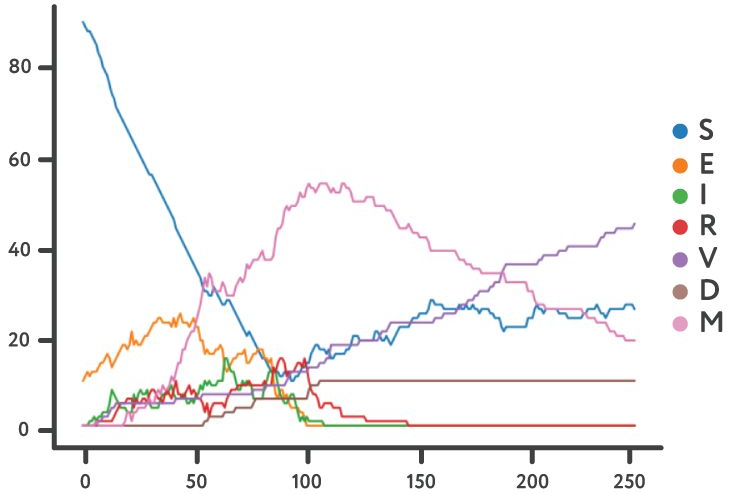


- SEIRVDM ON DIFFERENTIAL EQUATIONS

On Differential Equations



On Random Network



- **FUTURE PLANS**

  - Test Random Network on big values.
  - Optimize matrix operations.
  - Try on different vaccine types and different time periods.
  - Transfer project code on C++ and CUDA respectively.