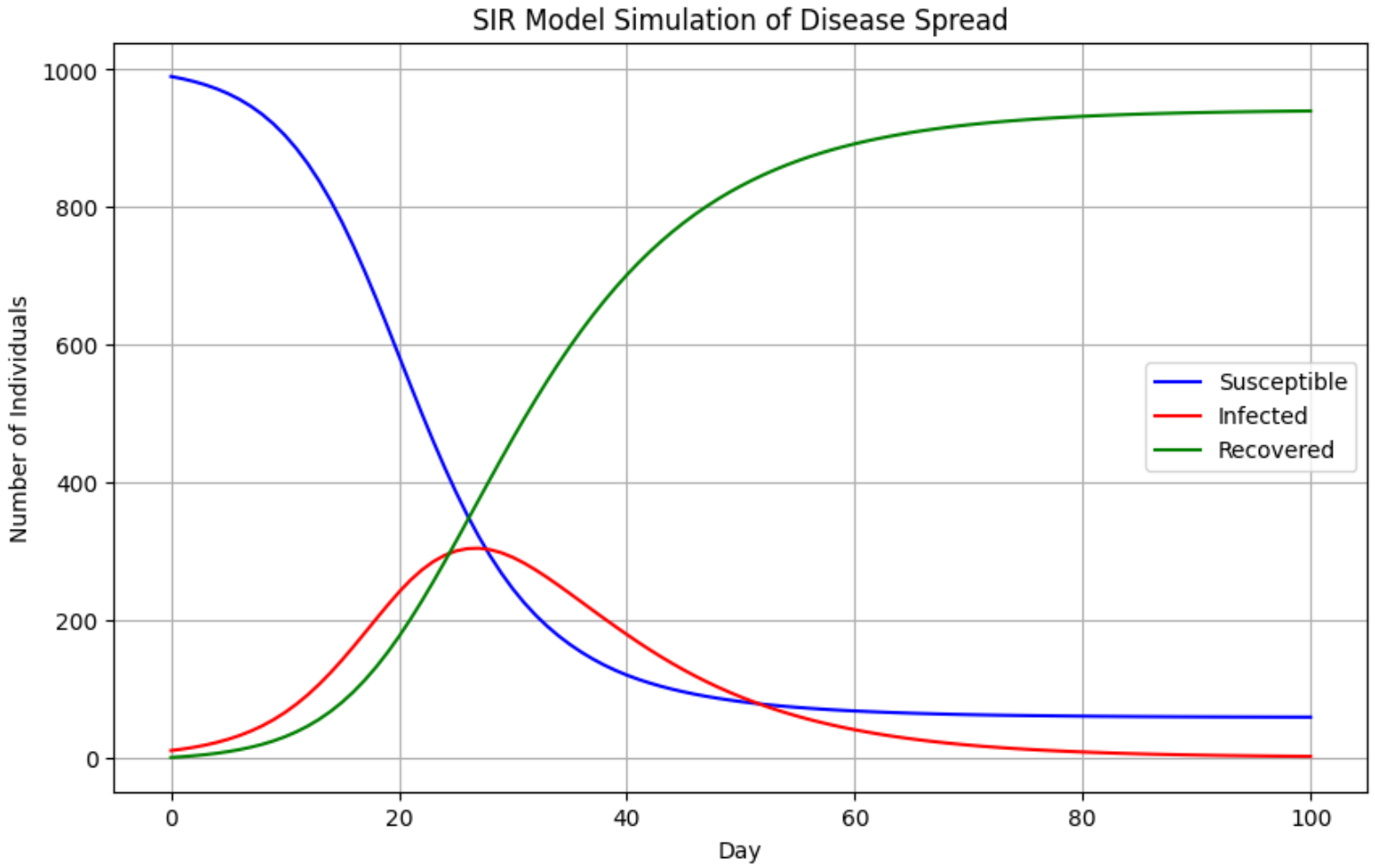
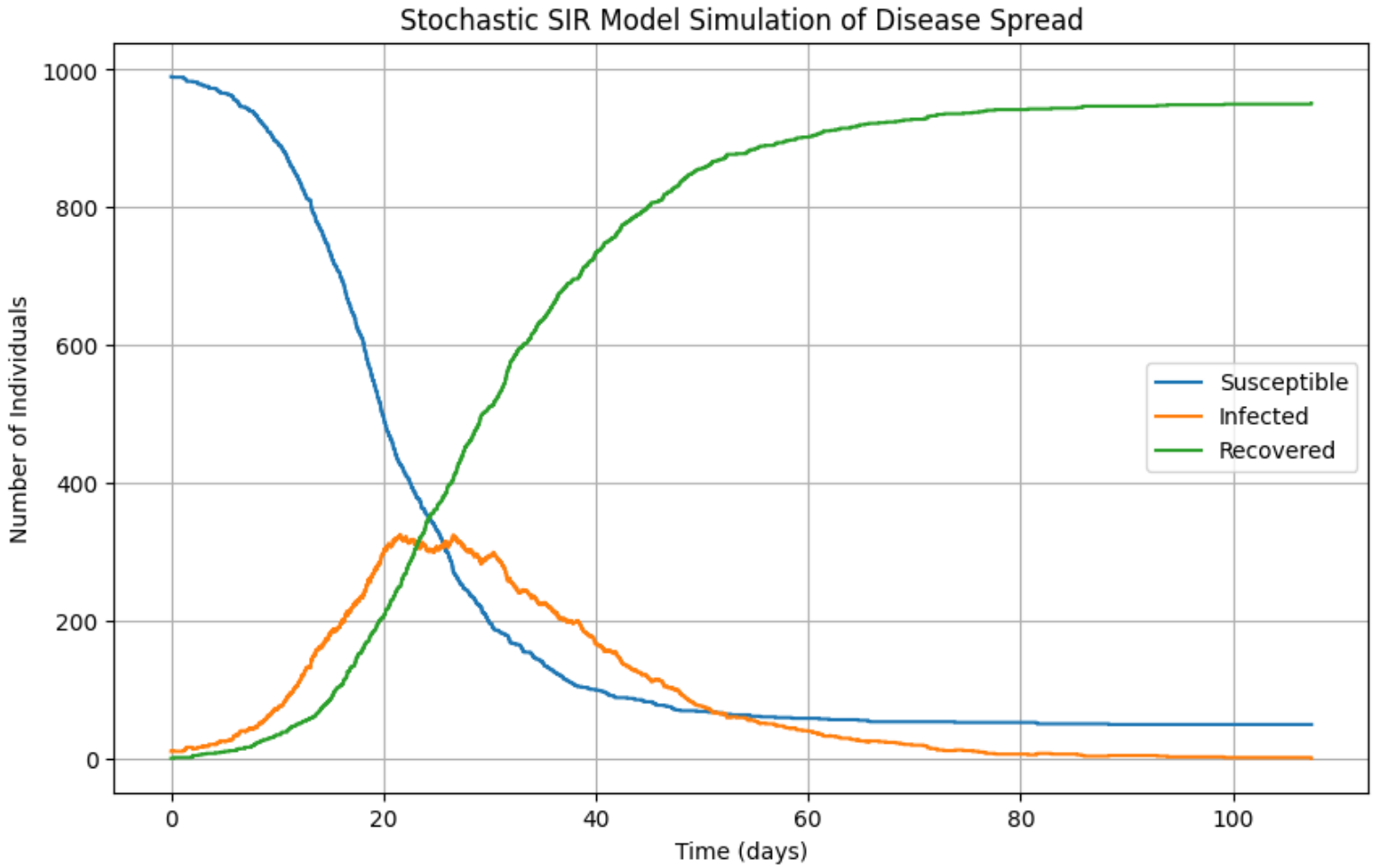
ANALYSIS OF EPIDEMIC SPREAD USING MATHEMATICAL AND COMPUTATIONAL MODELS

By Jonah Zembower

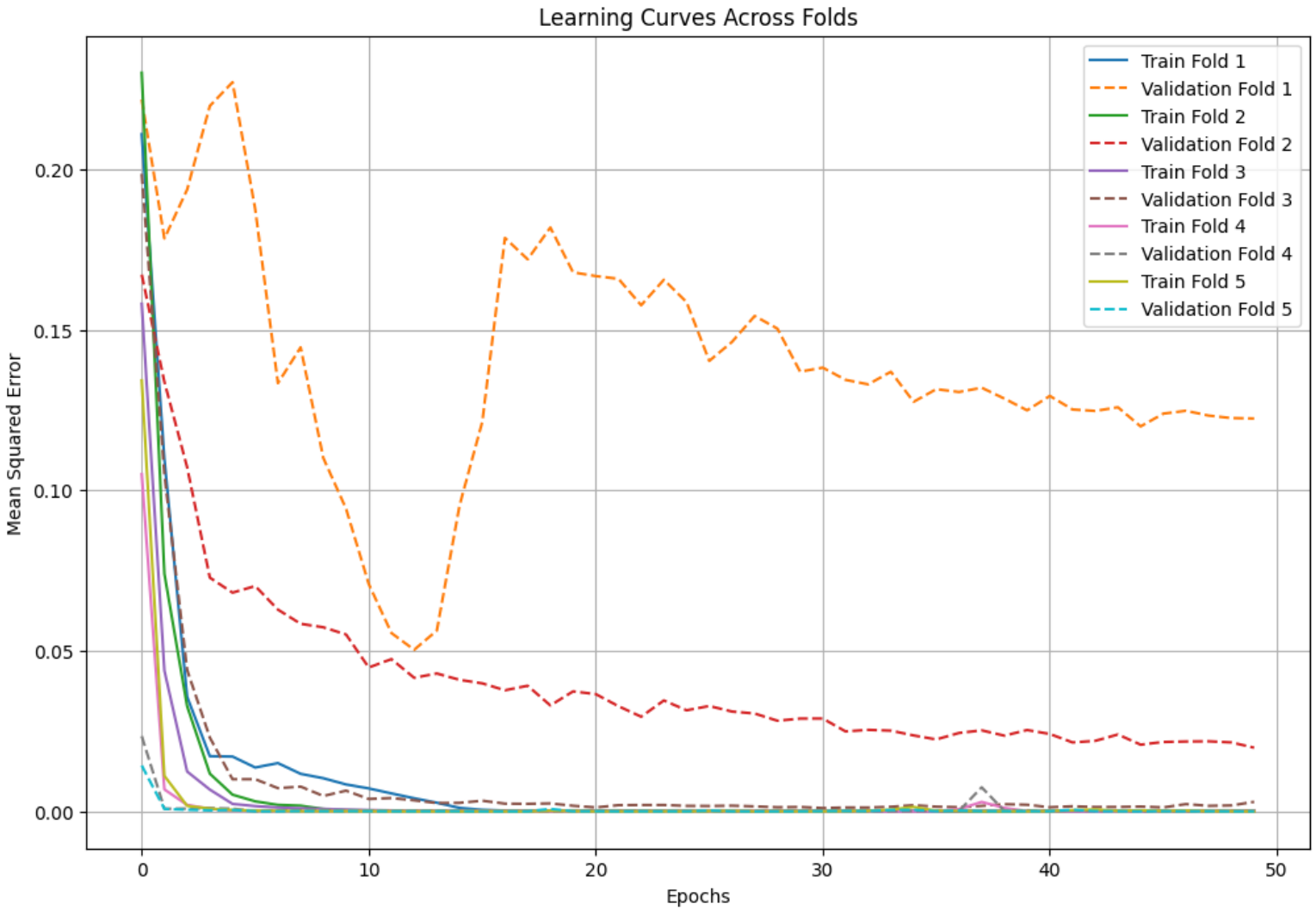
SIR MODEL SIMULATION OF DISEASE SPREAD

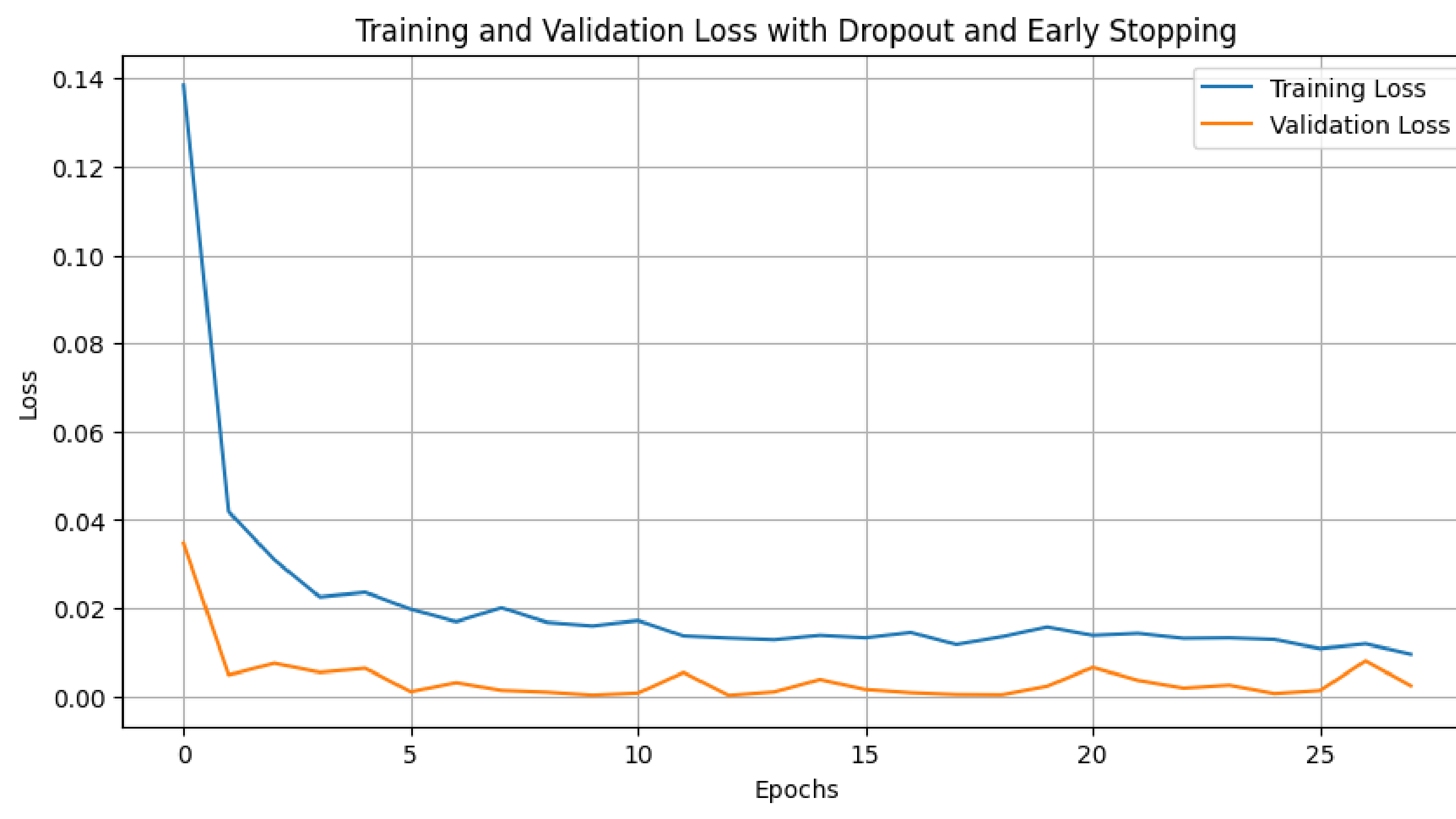


STOCHASTIC SIR MODEL SIMULATION OF DISEASE SPREAD

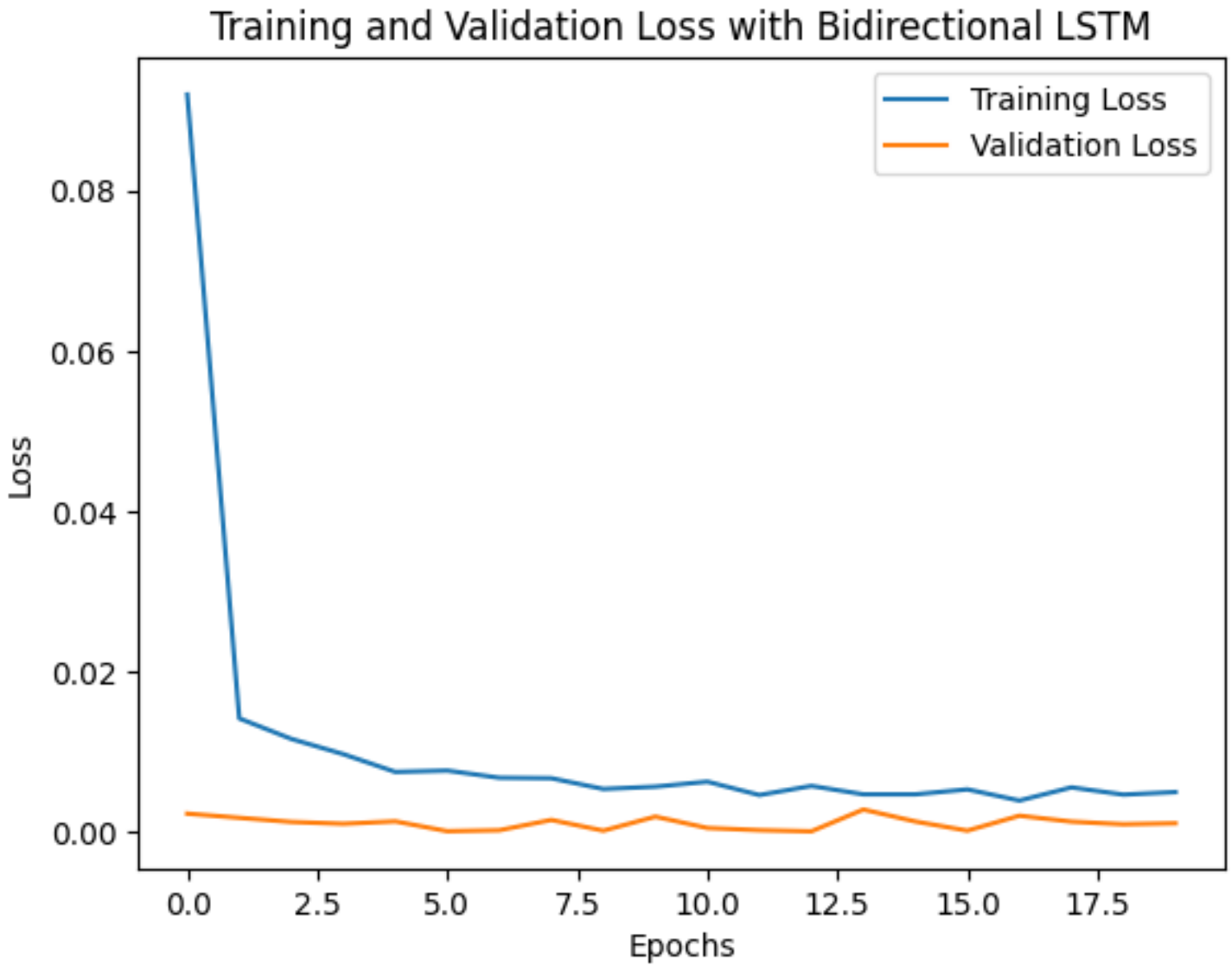


NEURAL NETWORK



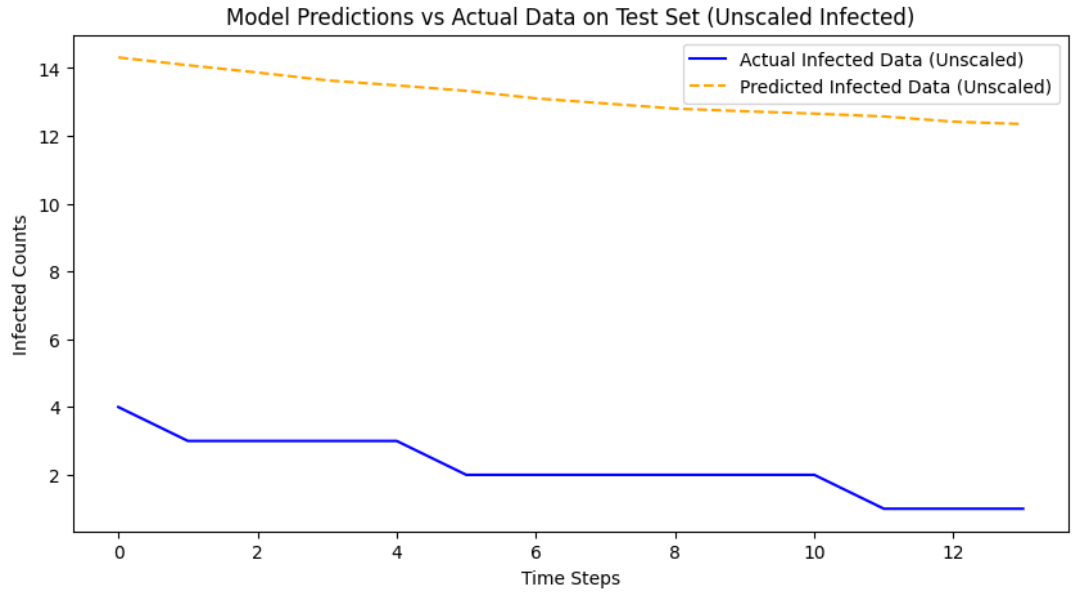

Training and Validation Loss with Dropout and Early Stopping
Training Loss
Validation Loss
Loss
Epochs
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
0
5
10
15
20
25

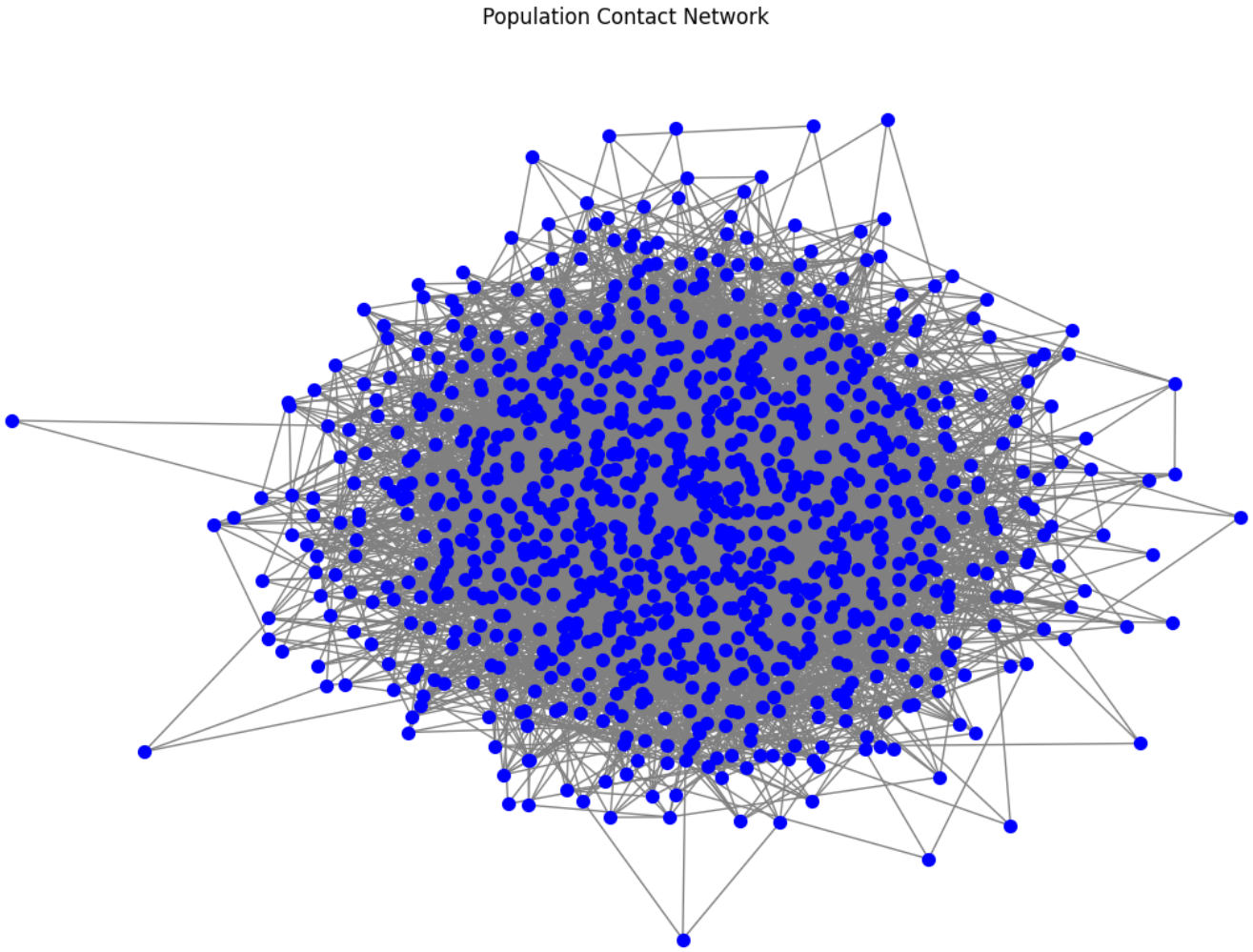
FOUND TO WORK BETTER WITH BIDIRECTIONAL LSTM



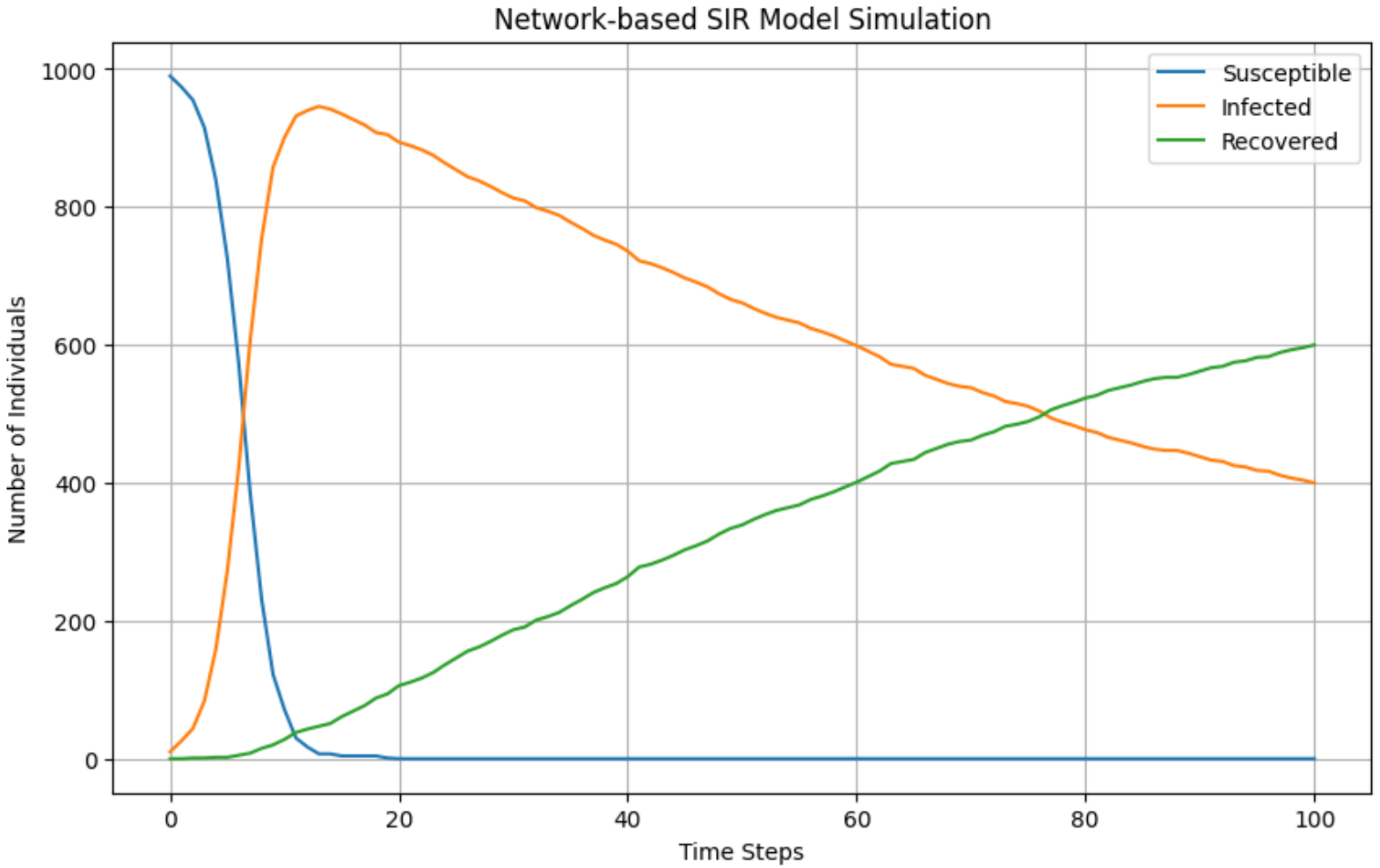
FINAL VARIABLE PREDICTIONS

- These predictions change with new runs over time, however, you can see need for general improvement
- Mean Squared Error: 120.01606414334957
- Mean Absolute Error: 10.949203430000974





GRAPH THEORY ANALYSIS



NETWORK BASED SIR MODEL

COMPARING INTERVENTION STRATEGIES