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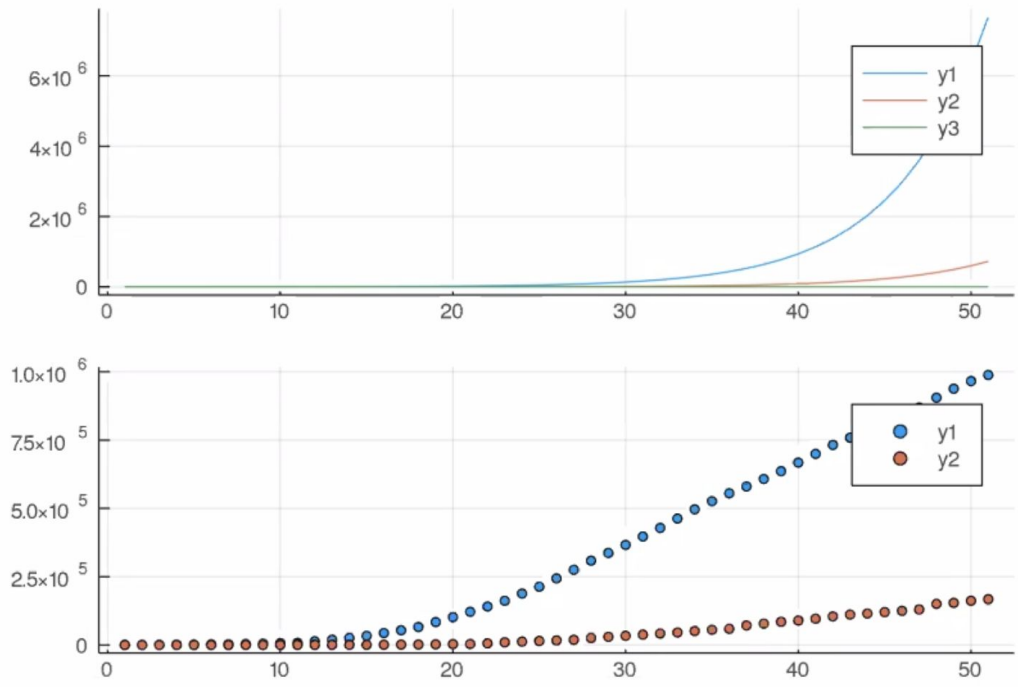
MATH 189Z Preliminary Findings

What have we done?

We were hoping to use the SEIR model to predict parameters for disease transmission, and using that alone, we got the following results (solid lines -> predictions, dotted lines -> real data), where the y-axis is the case count (y_1 for confirmed cases in the US, and y_2 for deaths/recovered cases in the US), and the x-axis is the days since the 500th case in the US.



We found another paper (Dandekar & Barbastathis) that used the SEIR differential equation model we were considering. We've done some prelimiary analysis of the data, and we've run a NN with the SEIR+Q model from the paper, we still need to figure some things out.

What do we still need to do?

We will need to consider data from other countries to use as comparison.

Sources:

1. Dandekar, R., & Barbastathis, G. (2020). *Quantifying the effect of quarantine control in Covid-19 infectious spread using machine learning* [Preprint]. Epidemiology. https://doi.org/10.1101/2020.04.03.20052084
2. *AWS Marketplace: COVID-19 - World Confirmed Cases, Deaths, and Testing*. (n.d.). Retrieved April 23, 2020, from https://aws.amazon.com/marketplace/pp/COVID-19-World-Confirmed-Cases-Deaths-and-Testing/prodview-3b32sjummof5s

3. *SEIR Model*. (n.d.). Arizona State University. Retrieved April 23, 2020, from http://www.public.asu.edu/~hnesse/classes/seir.html?Beta=0.9&Gamma=0.2&Sigma=0.5&Mu=0&Nu=0&initialS=10&initialE=1&initialI=0&initialR=0&iters=15
4. Ferguson, N., Laydon, D., Nedjati Gilani, G., Imai, N., Ainslie, K., Baguelin, M., Bhatia, S., Boonyasiri, A., Cucunuba Perez, Z., Cuomo-Dannenburg, G., Dighe, A., Dorigatti, I., Fu, H., Gaythorpe, K., Green, W., Hamlet, A., Hinsley, W., Okell, L., Van Elsland, S., ... Ghani, A. (2020). *Report 9: Impact of non-pharmaceutical interventions (NPIs) to reduce COVID19 mortality and healthcare demand*. Imperial College London. https://doi.org/10.25561/77482