INTRODUCTION
Traditional approaches include finite difference, finite element etc. They can’t effectively handle high dimensional equations.
- Data-driven models can be used to learn/approximate the governing equations of a dynamical system using deep neural network (DNN).
- Residual Network (ResNet) is effectively used in this work as an Euler method.

METHOD
- Data is obtained from a numerical solver then passed into the ResNet model as a one-time-stepping Euler method.
- Both linear and nonlinear system of ODE were used as test examples.
- Keras and Tensorflow on Python were used to build and generate the results.

REFERENCE
Qin Tong, Wu Kailiang, Xiu Dongbin

RESULTS
We present a data-driven model as a numerical method to learn the unknown function of a dynamical system. In particular, residual network (ResNet) as a one-time-stepping Euler method is used to solve partial differential equations.

Prediction accuracy was 100%. Relative error in prediction was 0.19e-01 and 0.23e-01 for x1 and x2 respectively.

DISCUSSION
- No benchmark error comparison.
- We will build neural network models to learn the dynamics of SIR models for COVID-19 both as forward and inverse problems.