Homework 4

(1) Based on the dataset *hw4_data.csv*, which includes the power system operation states (e.g. active and reactive generation(PV_P, PV_Q), power load(Pl, Ql), bus voltage(Va, Vm), line power flow(Line_Ps, Line_Qs), line power loss(Line_Pl, Line_Ql).) and the small-signal stability states (named '*SSSA*', 1 for safe, 0 for unsafe) of an IEEE 118-bus test system. Please use classification methods to fit *SSSA* by the operation states.

- Basic requirements: Try to find the best classification results (by SVM, DT, and so on).
- Further thinking: The precise awareness of insecurity power system state is usually critical for power system operation, which results in different tolerances of **false-negative** and **false-positive** samples. Try to consider this situation in your model.

References on the IEEE 118-bus test system (not on the dataset):
http://labs.ece.uw.edu/pstca/pf118/pg_tca118bus.htm
https://matpower.org/docs/ref/matpower5.0/case118.html