Types of problems for the final

1.

1. For a given model, perform sensitivity analysis and remove random variables that do not affect the output much
2. Propagate uncertainties through the model
3. Replace the model with the surrogate model using Gaussian processes
4. Propagate uncertainties through the new model

2. You are developing a new device and for that device you performed measurements and compared it against the reference. Both reference and data and data from you device are given

1. Develop a model for that device – Bayesian regression
2. Now, the physical model is given – calibrate that model.
3. Data from another device on the market is given – draw scatter and Bland Altman plots.
4. Fit data to the mixed effect model
   1. Use traditional methods as we did in the lecture
   2. Use Bayesian based on PyMC3
   3. Find the agreement metrics and comment on them
5. Now, the device is in production and it is based on the regression model. Given these inputs, compute the estimates together with their uncertainties.

3. You are supposed to design a system and need to select the components for the system. The desired accuracy of the system is 1% of the nominal value. Select the components of the system.

4. Data is given. Perform hierarchical/mixure modeling and compare performance of different models. Do model averaging in PyMC3

5. Time series data is given. Define AR(2) model. Analyze the uncertainty of the parameters of the model. Perform prediction using that model.

6. State-space model is given. It is nonlinear and non Gaussian. Analyze performance of that system using particle filters. How confident are you in your predictions.