

# Report title

Team name and members

## Subsystem 1 (rename this heading and copy the entire section for each subsystem)

Present your subsystem-level problem. Introduce it with some text to explain the objective, motivation, and modeling approaches used.

### A. Optimization formulation

In negative null form, present the subsystem optimization formulation. This should stand alone and be able to be optimized without knowing anything about the other subsystems. If there are interdependencies, use parameters to represent assumptions needed to decouple the subsystems. Be consistent with variable names in the system-level formulation.

$$\begin{aligned} & \min_x f(x_1, x_2, x_3, \dots, p_1, p_2) \\ \text{where } & x = (x_1, x_2, x_3, \dots) \\ & p = (p_1, p_2, p_3, \dots) \\ \text{subject to } & g_1(x_i, \dots) \dots \\ & g_2(x_i, \dots) \dots \\ & g_3(x_i, \dots) \dots \\ & g_4(x_i, \dots) \dots \end{aligned}$$

Assignment Project Exam Help

Describe all functions and variables. Justify this structure using references and explain any assumptions.

### B. Modeling approach

Describe all models needed. This should make it entirely clear how the objective and each constraint are calculated. Justify each model/function with a reference or an explanation of why the model is meaningful. Explain any assumptions that you have made.

### C. Explore the problem space

Analyze the monotonicity or expected/known constraint activity to the extent possible (you may not know much about this at this time). Simplify your formulation if possible.

If the functions are simulations (black boxes), conduct a DOE covering the design space and see if you can determine monotonicity or develop a useful metamodel.

### D. Optimize

Test two different optimization algorithms using MATLAB. Explain how you set this up and solved it, and show the results (both optimum and optimizers!). Discuss which algorithm seemed to work best, and/or discuss the pros and cons of each.

### E. Conclusions and next steps

Briefly summarize this subsystem's optimization. Describe some of the challenges, design implications, and thoughts about how to improve the analysis for the final report.