

ME 401

Systems and Applications

Semester: Spring 2026

LLM: Anthropic, Sonnet 4.5

PRIMARY QUESTION

I am working to leverage generative AI for the purpose of exploring python as a means to automate engineering analysis automation

INITIAL THOUGHTS

I want to be very clear with the LLM about my goals and intended outcomes, so I need to provide clear context. I will then ask that it start with a counter prompt of clarifying questions so that I know what to expect and can compare the artifact to a clear line of inputs and context

PROMPT

1) "I have a working Rankine cycle analysis script (attached) that uses OOP to calculate thermodynamic states and performance for a basic steam power cycle. I need you to create an optimization script using scipy that: 1. Imports and uses my existing RankineCycle class 2. Optimizes cycle parameters (boiler pressure, boiler temperature, condenser pressure) to maximize thermal efficiency 3. Applies realistic constraints (pressure limits, superheat requirements, turbine inlet temp limits) 4. Visualizes the optimization results (contour plots showing efficiency vs. parameters) 5. Demonstrates scipy.optimize best practices for engineering problems I'm a senior ME student building Python skills - keep it readable with comments explaining the optimization approach. Focus on teaching me how to set up objective functions, constraints, and bounds for thermodynamic optimization problems." start with clarifying question, concise please

2) write one more prompt for a new chat which contextualized both the rankine cycle and optimization scripts. the goal is to generate an artifact which exists as a simple run scripts for me to interface with these to OOP files and generate nicely formatted outcomes for inclusion in an engineering report

3) my mistake. I should have been clear that this is another .py artifact. I think that looking into react would be helpful at a future date, but for now I am only interested in python. In the python file, add a comment at the end of the file prompting exploration into react and other valuable tools that could make me a more competent and valuable engineer in the future please

RESULTS

The clarifying questions were trivial here. I think that the context was sufficient for this to write a meaningful script which is beyond my comprehension, but through careful study, will allow me to really grow in terms of code and optimization comprehension

OUTPUT

Helpful. –

The quality of comments provided in code are excellent and will allow me to study this topic

effectively going forward

Unhelpful. –

I was not specific enough in my final prompt creating a follow up prompt for a new chat. The LLM decided to use React for my project, which I do not want. However, I realized that this might be an excellent tool to explore at a future date. So I asked it to include a comment prompting me to explore these non python tools

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