Initial test run of code

In the “Getting Started” folder of the Matlab Codes, you will find several test codes to be sure your file paths are set correctly. The comments in these codes will guide you through setting up, running, and checking the results of the code. There are tests codes to set up both the Brayton cycle model and the outer optimization code.

Changes that need to be made

* To run the optimization, you will need to tell the code to initialize python from Matlab. In the reactor mass code, modify lines 22 and 23 with your computer name and the location of the python code.

Observing Pressure Drops

* To manipulate pressure drops to on or off, change value in line 20 of the findPressures code in the Brayton Cycle folder. To use the property tables method of calculating fluid properties, the pressure drops must be off. When using FIT or REFPROP directly, pressure drops may be set to on.

Troubleshooting tips for initial inputs

* Be sure the MATLAB “current folder” is the “Reactor\sCO2\_reactor\optimization” folder or the python code will be unable to locate the data text files that are required.

Troubleshooting tips for other inputs

* Some anticipated warnings have display messages with further explanations and instructions. These will appear above the MATLAB warnings in the command window.
* There are two hard coded guess values that sometimes cause problems. One is located in “minApanelFind” lines 24 through 45. The UA value corresponding to the minimum radiator panel area may need to be adjusted along with the initial range of radiator panel areas to search for the minimum radiator panel area when different fluids are used. The second guess value is located in “findMaxPowerGivenUA” lines 25 and 25. The guess values for the mass flow rate for a given system sometimes need to be adjusted. Again, this is typically a problem that arises when the working fluid is changed.

Adding new fluids from Refprop

* MATLAB file “createTables” is available in the Properties Functions folder. This code takes a matrix input that is retrieved from Refprop. The required format and units of the properties matrix is stated in the comments of the “createTables” code. Running this code provides a large matrix of data that includes the cubic spline coefficients used for property interpolation. The dew point temperature of the fluid must be added to the first row after the last column of the data as this is used in the optimization algorithm. This final matrix is used as the “mode” for simulations.

If the reactor properties are out of range for pure CO2

* You can update the reactor properties in the properties.ees file located in the Reactor code folder. Update the parametric table with the desired ranges of temperature (repeating pattern every 100 values) and pressure (applying pattern every 100 values). Run the table, and save the table as CO2.txt in the Reactor\sCO2\_reactor\data folder.