Table of Contents

Project 2 Analysis 1
Usefull Constants 1
Given Data 1
Import Collected Data 1
Convert Data 2
Call a Helper function for each Deliverable 4

Project 2 Analysis

This script is the main controller for the SR30 analysis in Project 2 of ME140. It should import data, and call the component functions for each of the individual parts of the project.

Authors: Jean-Christophe Perrin, Beck Goodloe, Richard Randall, Jason Trinidad

Created: 2018-04-11 Edited: 2018-04-11

```
clear all;
clc;
```

Usefull Constants

These are mostly conversion factors so that we can convert from imperial units collected into metric.

```
const.insqToMsq = 0.00064516; % [m^2/in^2]
const.lbfToN = 4.44822; % [N/lbf]
const.R = 287; % [kJ/kg/k] Gas cosntant of air
const.KCdiff = 273; % [
const.kPaToPa = 1e3; % [Pa/kPa]
```

Given Data

The following values were supplied to us in the original project specifications and should not be changed.

```
given.pitotEffectiveArea = 6.4*const.insqToMsq; % [m^2]
given.jetAHeating = 42.8e6; % [J/kg/K]
given.A = [27.3, 6.4, 9.0, 7.2, 4.7, 3.87]'.*const.insqToMsq; % [m^2]
```

Import Collected Data

Our collected data is in an excel file named `Data_proj2`. Here we import that data into a vector for use in our MatLab script. The excel file should never be modified by our script.

```
fname = 'Data_proj2.xlsx';
sname = 'CollectedData';
range = 'A3:M11';
%[NUM, TXT, RAW] = xlsread(fname, sname, range); % basic reading
```

```
stateData = readtable(fname, 'Sheet', sname, 'Range', range);
```

Convert Data

Before we start to do calculations on this data, let's convert it to the basic units that we will use throughout the course of our analysis. That means converting all temperature values into Kelvin and all pressure values into Pascals.

```
stateData{:, 2:6} = stateData{:, 2:6} + const.KCdiff; % convert T to [K]
stateData{:, 7:11} = stateData{:, 7:11} * const.kPaToPa + 1; % convert P to [Pa]
stateData.Properties.VariableUnits = {'', 'K', 'K', 'K', 'K', 'K', ...
    'Pa', 'Pa', 'Pa', 'Pa', 'Pa', 'kg/s', 'N'};
summary(stateData);
```

```
Variables:

    RPM: 8×1 double

        Values:

            Min         0
            Median      0
            Max         0

    T2: 8×1 double

        Units:  K
        Values:

            Min         273
            Median      273
            Max         273

    T3: 8×1 double

        Units:  K
        Values:

            Min         273
            Median      273
            Max         273

    T4: 8×1 double

        Units:  K
        Values:

            Min         273
            Median      273
            Max         273
```

```
T5: 8×1 double

    Units:  K
    Values:

        Min       273
        Median    273
        Max       273

T8: 8×1 double

    Units:  K
    Values:

        Min       273
        Median    273
        Max       273

P2: 8×1 double

    Units:  Pa
    Values:

        Min       1
        Median    1
        Max       1

P3: 8×1 double

    Units:  Pa
    Values:

        Min       1
        Median    1
        Max       1

P4: 8×1 double

    Units:  Pa
    Values:

        Min       1
        Median    1
        Max       1

P5: 8×1 double

    Units:  Pa
    Values:

        Min       1
        Median    1
        Max       1
    P8: 8×1 double

        Units:  Pa
        Values:

            Min       1
            Median    1
            Max       1

    Fuel: 8×1 double

        Units:  kg/s
        Values:

            Min       0
            Median    0
            Max       0

    Thrust: 8×1 double

        Units:  N
        Values:

            Min       0
            Median    0
            Max       0
```

Call a Helper function for each Deliverable

Each function should take in the current table of calculated data and then add to it the component values that it calculates.

```
stateData = deliverable2(stateData, given, const);
stateData = deliverable3(stateData, given, const);
stateData = deliverable4(stateData, given, const);
```

```
  Columns 1 through 9

    'RPM'    'T2'    'T3'    'T4'    'T5'    'T8'    'P2'    'P3'
 'P4'

  Columns 10 through 13

    'P5'    'P8'    'Fuel'    'Thrust'

Hello, world! 1
Hello, world! 2
Hello, world! 3
```

Published with MATLAB® R2017b