```
function [thrust, thrustReserve] = ThrustRequiredJetFunc(V, height, plotVal)
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%%%%%%%%%%%%%
% Author: Hudson Reynolds, Preston Wright
% Description: function that finds thrust for jet based on velocity
%
% Inputs:
% V - velocity [m/s]
% height - current altitude of jet [m]
% plot - turn plotting on or off. Set to 1 to plot.
%
% Outputs:
% thrust - the required thrust to maintain SLUF conditions [N]
% thrustReserve - the percentage of thrust remaining [N]
% plots - see outputs
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%%%%%%%%%%%%%

% included so script doesn't throw errors when publishing. Delete these to
% run it as a function
height = 0;
V = 100:1:275;
plotVal = 1;

% constants:
[~, ~, ~, rho0] = atmosisa(0);     % density of air at sea level [kg/m^3]
[~, ~, ~, rho] = atmosisa(height); % density of air [kg/m^3]
A = 88.2;                          %wing area [m^2]
W = 33100;                         % weight [kg]
cL0 = 0.02;                        % zero AoA cL
cLa = 0.12;                        % slope of cL / alpha
cD0 = 0.015;                       % zero AoA cD
cDa = 0.05;                        % induced drag coefficient
t0max = 55620;                     % sea level thrust [N]

% calculations:
[~, lift, drag] = LiftDragFunc(A, rho, cL0, cLa, cD0, cDa, V, W);

thrust = drag;

thrustMax = (rho / rho0)^0.6 * t0max;

thrustReserve = 1 - (thrust / thrustMax);


%plots:
if plotVal == 1
    close all

    hfig = figure;  % save the figure handle in a variable
    fname = 'Thrust v Velocity Graph Jet';
```

```
    hold on

    plot(V, thrust / 1e3)
    title("Velocity v Thrust Jet Aircraft")
    xlabel("Velocity [m/s]")
    ylabel("Thrust [kN]")

    picturewidth = 20; % set the width of image in cm
    hw_ratio = .6; % aspect ratio
    set(findall(hfig,'-property','FontSize'),'FontSize',16) % adjust font
size

    grid on

    set(findall(hfig,'-property','Box'),'Box','off') % turn off box
    set(findall(hfig,'-property','Interpreter'),'Interpreter','latex')
    set(findall(hfig,'-
property','TickLabelInterpreter'),'TickLabelInterpreter','latex')

    set(hfig,'Units','centimeters','Position',[3 3 picturewidth
hw_ratio*picturewidth])
    pos = get(hfig,'Position');

set(hfig,'PaperPositionMode','Auto','PaperUnits','centimeters','PaperSize',
[pos(3), pos(4)])
    %print(hfig,fname,'-dpdf','-vector','-fillpage')

    print(hfig,fname,'-dpng','-r300')
end


ans =

   1.0e+04 *

  Columns 1 through 7

    1.7862    1.7833    1.7810    1.7795    1.7787    1.7785    1.7790

  Columns 8 through 14

    1.7801    1.7818    1.7841    1.7870    1.7905    1.7944    1.7990

  Columns 15 through 21

    1.8040    1.8096    1.8156    1.8222    1.8292    1.8366    1.8446

  Columns 22 through 28

    1.8529    1.8618    1.8710    1.8806    1.8907    1.9012    1.9120

  Columns 29 through 35

    1.9233    1.9349    1.9469    1.9593    1.9720    1.9851    1.9985
```

Columns 36 through 42

2.0123 2.0264 2.0409 2.0556 2.0707 2.0862 2.1019

Columns 43 through 49

2.1179 2.1343 2.1509 2.1679 2.1851 2.2027 2.2205

Columns 50 through 56

2.2386 2.2570 2.2756 2.2946 2.3138 2.3333 2.3530

Columns 57 through 63

2.3730 2.3933 2.4138 2.4346 2.4557 2.4770 2.4985

Columns 64 through 70

2.5203 2.5423 2.5646 2.5871 2.6099 2.6329 2.6561

Columns 71 through 77

2.6795 2.7032 2.7272 2.7513 2.7757 2.8003 2.8251

Columns 78 through 84

2.8502 2.8755 2.9010 2.9267 2.9526 2.9788 3.0051

Columns 85 through 91

3.0317 3.0585 3.0855 3.1127 3.1402 3.1678 3.1956

Columns 92 through 98

3.2237 3.2519 3.2804 3.3091 3.3379 3.3670 3.3963

Columns 99 through 105

3.4258 3.4554 3.4853 3.5154 3.5457 3.5761 3.6068

Columns 106 through 112

3.6377 3.6687 3.7000 3.7314 3.7630 3.7949 3.8269

Columns 113 through 119

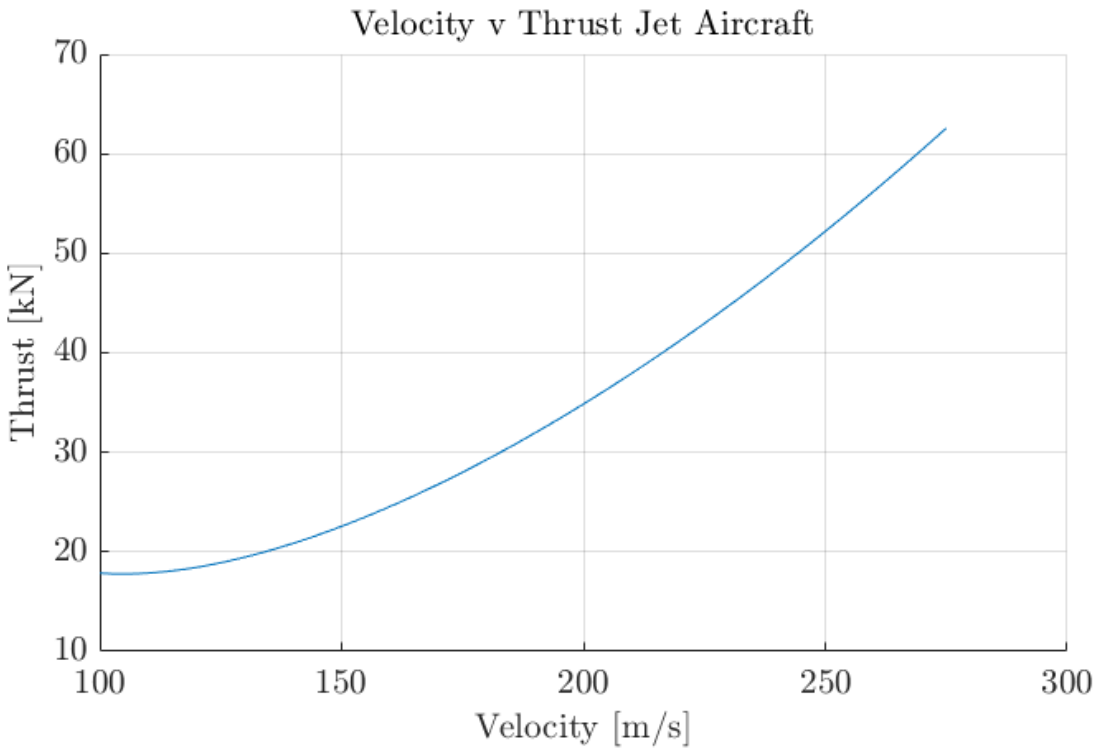
3.8591 3.8915 3.9241 3.9569 3.9899 4.0230 4.0564

Columns 120 through 126

4.0899 4.1237 4.1576 4.1917 4.2260 4.2604 4.2951

Columns 127 through 133

```
  4.3299    4.3650    4.4002    4.4356    4.4712    4.5069    4.5429

Columns 134 through 140

  4.5790    4.6153    4.6518    4.6885    4.7253    4.7624    4.7996

Columns 141 through 147

  4.8370    4.8745    4.9123    4.9502    4.9883    5.0266    5.0651

Columns 148 through 154

  5.1037    5.1426    5.1816    5.2207    5.2601    5.2996    5.3393

Columns 155 through 161

  5.3792    5.4193    5.4595    5.4999    5.5405    5.5813    5.6222

Columns 162 through 168

  5.6634    5.7046    5.7461    5.7877    5.8296    5.8715    5.9137

Columns 169 through 175

  5.9560    5.9985    6.0412    6.0841    6.1271    6.1703    6.2137

Column 176

  6.2572
```



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