```
%% Q2.a
clear; clc; close all;

dirs = {'AL - 0.xlsx', 'AL - 1.xlsx', 'AL - 2.xlsx'}

fig1 = figure ("Name","T_c as a Function of O/F ratio",'Position',[100 300 900↙
500]);
hold on;

for indexs = 1:length(dirs)
    data = readtable(dirs{indexs});
    T_c = data.t;
    o_to_f = linspace(5, 10, length(T_c));

    plot(o_to_f, T_c,'LineWidth',1.5)
end

grid on
grid minor
ylabel("Tc [K]")
xlabel("O/F [-]")
title("T_c as a Function of O/F ratio")
subtitle("Almog Dobrescu 214254252")
legend({'AL - 0%', 'AL - 10%', 'AL - 20%'},'FontSize',11 ,'Location','southeast')
%exportgraphics(fig1, 'grap1.png','Resolution',1200);

%-------------------------------------------------------------------------
dirs = {'AL - 0.xlsx', 'AL - 1.xlsx', 'AL - 2.xlsx'}

Mw_headers = 1e-3*[2*1.008+15.9994, 1.008+35.453, 12.0107+2*15.9994, 2*14.0087,↙
12.0107+15.9994, 15.9994+1.008, 35.453, 1.008*2, 15.9994*2, 2*26.9815+3*15.9994];
% Mw_headers = 1e-3*[2*1+16, 1+35.453, 12+2*16, 2*14, 12+16, 16+1, 35.453, 1*2,↙
16*2, 2*26.9815+3*16];
R0 = 8.314;

fig2 = figure ("Name","C* as a Function of O/F ratio",'Position',[250 300 900↙
500]);
hold on;

for indexs = 1:length(dirs)
    data = readtable(dirs{indexs});
    T_c = data.t;
    gamma = data.gam;
    o_to_f = linspace(5, 10, length(T_c));
    names = data.Properties.VariableNames;
    species = {};
    x_i = [];
    A = data.Variables;
    count = 1;
    for n = 1:length(names)
```

```
 47         if names{n} ~= 't'
 48             if names{n} ~= "gam"
 49                 species{count} = names{n};
 50                 x_i(:, count) = A(:, n);
 51                 count = count+1;
 52             end
 53         end
 54     end
 55
 56     for j = 1:length(o_to_f)
 57         Gamma(j) = gamma(j)^0.5*(2/(gamma(j)+1))^((gamma(j)+1)/(2*(gamma(j)-1)));
 58         Mw_bar(j) = dot(Mw_headers(1:length(x_i(j,:))), x_i(j,:))/sum(x_i(j,:));
 59         C_star(j) = 1/Gamma(j)*(R0*T_c(j)/(Mw_bar(j)))^0.5;
 60     end
 61
 62
 63     plot(o_to_f, C_star,'LineWidth',1.5)
 64
 65 end
 66
 67 grid on
 68 grid minor
 69 ylabel("C* [m/sec]")
 70 xlabel("O/F [-]")
 71 title("C* as a Function of O/F ratio")
 72 subtitle("Almog Dobrescu 214254252")
 73 legend({'AL - 0%', 'AL - 10%', 'AL - 20%'},'FontSize',11 ,'Location','northeast')
 74 % exportgraphics(fig2, 'grap2.png','Resolution',1200);
 75
 76 %-------------------------------------------------------------------------
 77 dirs = {'AL - 0.xlsx', 'AL - 1.xlsx', 'AL - 2.xlsx'}
 78
 79 Mw_headers = 1e-3*[2*1.008+15.9994, 1.008+35.453, 12.0107+2*15.9994, 2*14.0087,↙
12.0107+15.9994, 15.9994+1.008, 35.453, 1.008*2, 15.9994*2, 2*26.9815+3*15.9994];
 80 % Mw_headers = 1e-3*[2*1+16, 1+35.453, 12+2*16, 2*14, 12+16, 16+1, 35.453, 1*2,↙
16*2, 2*26.9815+3*16];
 81 R0 = 8.314;
 82 Pe = 1;
 83 Pc = 30;
 84 g0 = 9.81;
 85
 86 fig3 = figure ("Name","I_s_p as a Function of O/F ratio",'Position',[400 300 900↙
500]);
 87 hold on;
 88
 89 for indexs = 1:length(dirs)
 90     data = readtable(dirs{indexs});
 91     T_c = data.t;
 92     gamma = data.gam;
 93     o_to_f = linspace(5, 10, length(T_c));
```

```
 94     names = data.Properties.VariableNames;
 95     species = {};
 96     x_i = [];
 97     A = data.Variables;
 98     count = 1;
 99     for n = 1:length(names)
100         if names{n} ~= 't'
101             if names{n} ~= "gam"
102                 species{count} = names{n};
103                 x_i(:, count) = A(:, n);
104                 count = count+1;
105             end
106         end
107     end
108 
109     for j = 1:length(o_to_f)
110         Gamma(j) = gamma(j)^0.5*(2/(gamma(j)+1))^((gamma(j)+1)/(2*(gamma(j)-1)));
111         Mw_bar(j) = dot(Mw_headers(1:length(x_i(j,:))), x_i(j,:))/sum(x_i(j,:));
112         C_star(j) = 1/Gamma(j)*(R0*T_c(j)/(Mw_bar(j)))^0.5;
113         C_F(j) = Gamma(j)*(2*gamma(j)/(gamma(j)-1)*(1-(Pe/Pc)^((gamma(j)-1)/gamma↙
(j))))^0.5;
114         Isp(j) = C_F(j)*C_star(j)/g0;
115     end
116 
117 
118     plot(o_to_f, Isp,'LineWidth',1.5)
119 
120 end
121 
122 grid on
123 grid minor
124 ylabel("I_s_p [sec]")
125 xlabel("O/F [-]")
126 title("I_s_p as a Function of O/F ratio")
127 subtitle("Almog Dobrescu 214254252")
128 legend({'AL - 0%', 'AL - 10%', 'AL - 20%'},'FontSize',11 ,'Location','northeast')
129 % exportgraphics(fig3, 'grap3.png','Resolution',1200);
130 
131 %% Q2.c
132 
133 fig4 = figure ("Name","X_i as a Function of O/F ratio",'Position',[550 300 900↙
500]);
134 hold all
135 
136 colors = {"#0072BD", "#D95319", "#EDB120", "#7E2F8E", "#77AC30", "#4DBEEE",↙
"#FF00FF", "#000000", "#FF0000"};
137 
138 data = readtable('AL - 0.xlsx');
139 o_to_f = linspace(5, 10, length(T_c));
140 names = data.Properties.VariableNames;
```

```
141 species = {};
142 x_i = [];
143 A = data.Variables;
144 count = 1;
145 for n = 1:length(names)
146     if names{n} ~= 't'
147         if names{n} ~= "gam"
148             species{count} = names{n};
149             x_i(:, count) = A(:, n);
150             count = count+1;
151         end
152     end
153 end
154 species;
155 for n = 1:length(species)
156     plot(o_to_f, x_i(:, n),'LineWidth',1.5, 'Color',colors{n})
157     lgn{n} = species{n};
158 end
159
160 grid on
161 grid minor
162 ylabel("x_i [-]")
163 xlabel("O/F [-]")
164 title("x_i as a Function of O/F ratio")
165 subtitle("Almog Dobrescu 214254252")
166 legend(lgn,'FontSize',11 ,'Location','northeast')
167 % exportgraphics(fig4, 'grap4.png','Resolution',1200);
168
169
```