```
clc
T = linspace(15,80,100)
```

T = 1×100
```
   15.0000   15.6566   16.3131   16.9697   17.6263   18.2828   18.9394   19.5960 · · ·
```

```
% Source for data
% http://ddbonline.ddbst.com/AntoineCalculation/AntoineCalculationCGI.exe
% Vapor Pressure for Methanol
A_m = 8.08097;
B_m = 1582.27;
C_m = 239.7;
P_methanol = 10.^(A_m - (B_m./(C_m+T))) ;
P_methanol = P_methanol./760 % converting from mmHg to atm
```

P_methanol = 1×100
```
    0.0972    0.1009    0.1046    0.1085    0.1125    0.1167    0.1209    0.1253 · · ·
```

```
% Vapor Pressure for Ethanol
A_e = 8.20417;
B_e = 1642.89;
C_e = 230.3;
P_ethanol = 10.^(A_e - B_e./(C_e+T)) ;
P_ethanol = P_ethanol./760 % converting from mmHg to atm
```
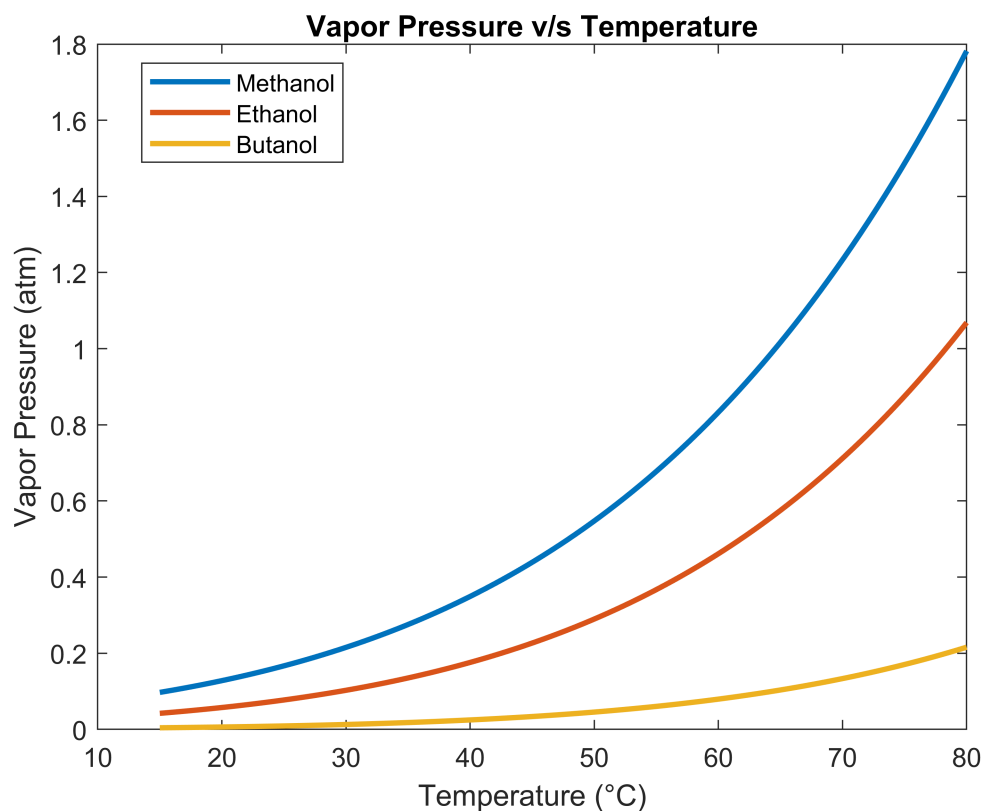
P_ethanol = 1×100
```
    0.0423    0.0440    0.0459    0.0478    0.0498    0.0518    0.0539    0.0561 · · ·
```

```
% Vapor Pressure for 1-Butanol
A_b = 7.92484;
B_b = 1617.52;
C_b = 203.296;
P_butanol = 10.^(A_b - B_b./(C_b+T)) ;
P_butanol = P_butanol./760 % converting from mmHg to atm
```

P_butanol = 1×100
```
    0.0043    0.0045    0.0048    0.0050    0.0053    0.0055    0.0058    0.0061 · · ·
```

```
% Vapor Pressure Plot
plot(T,P_methanol,LineWidth=2);
hold on;
plot(T,P_ethanol,LineWidth=2);
plot(T,P_butanol,LineWidth=2);
title("Vapor Pressure v/s Temperature");
xlabel("Temperature (°C)");
ylabel("Vapor Pressure (atm)");
legend("Methanol","Ethanol","Butanol", Location = 'best');
```

```
hold off
```

Vapor Pressure v/s Temperature


```matlab
% Relative Volatility Calculation
alpha_ME = P_methanol./ P_ethanol % Methanol and Ethanol
```

```
alpha_ME = 1×100
    2.3014    2.2913    2.2813    2.2715    2.2617    2.2521    2.2426    2.2332 ···
```

```matlab
alpha_EB = P_ethanol./ P_butanol  % Ethanol and Butanol
```

```
alpha_EB = 1×100
    9.8087    9.7112    9.6154    9.5214    9.4292    9.3386    9.2496    9.1623 ···
```

```matlab
alpha_MB = P_methanol./ P_butanol % Methanol and Butanol
```

```
alpha_MB = 1×100
   22.5734   22.2510   21.9359   21.6276   21.3262   21.0314   20.7429   20.4607 ···
```

```matlab
alpha_BB = P_butanol./P_butanol
```

```
alpha_BB = 1×100
     1     1     1     1     1     1     1     1     1     1     1     1 ···
```

```matlab
plot(T,alpha_ME,LineWidth=2);
hold on;
plot(T,alpha_EB,LineWidth=2);
plot(T,alpha_MB,LineWidth=2);
plot(T,alpha_BB,LineWidth=2);
title("Relative Volality v/s Temperature");
xlabel("Temperature (°C)");
```

```
ylabel("Relative Volatility");
legend("Methanol w.r.t Ethanol","Ethanol w.r.t Butanol","Methanol w.r.t Butanol","Butanol w.r.t
hold off
```


Relative Volality v/s Temperature
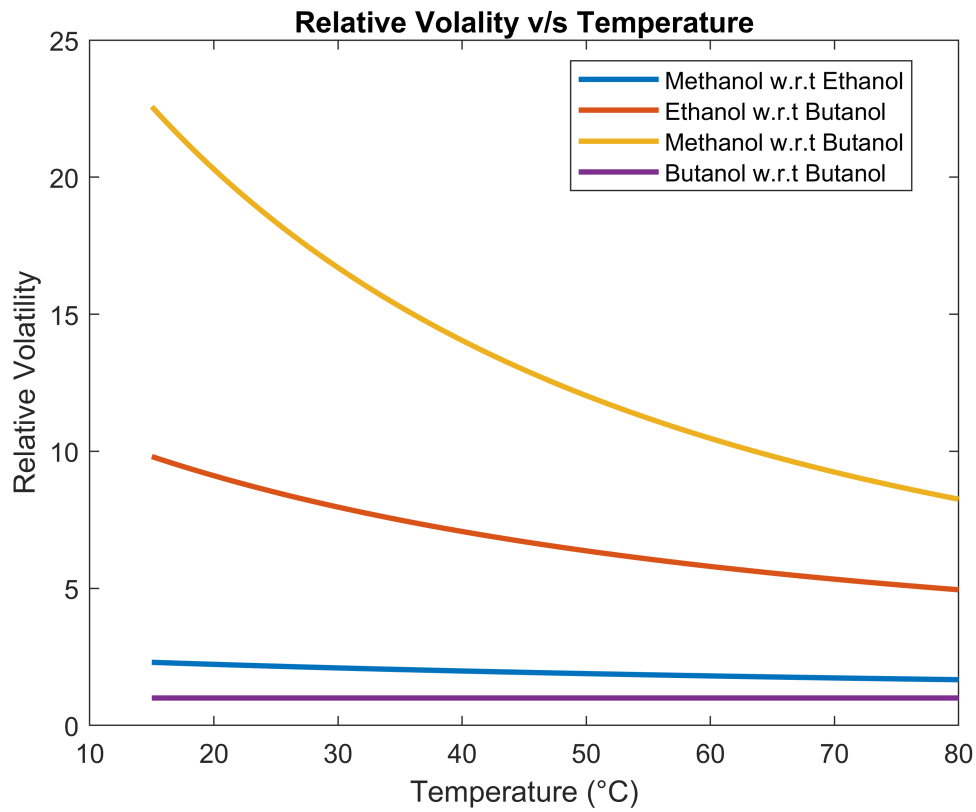
```
%Total Reflux Vapor Pressures
T_bottom_tr = 76.6;
T_top_tr= 63.3;

P_methanol_top_tr = 10.^(A_m - B_m./(C_m+T_top_tr));
P_methanol_top_tr = P_methanol_top_tr./760
```

P_methanol_top_tr = 0.9509

```
P_methanol_bottom_tr = 10.^(A_m - B_m./(C_m+T_bottom_tr));
P_methanol_bottom_tr = P_methanol_bottom_tr./760
```

P_methanol_bottom_tr = 1.5766

```
P_ethanol_top_tr = 10.^(A_e - B_e./(C_e+T_top_tr));
P_ethanol_top_tr = P_ethanol_top_tr./760
```

P_ethanol_top_tr = 0.5342

```
P_ethanol_bottom_tr = 10.^(A_e - B_e./(C_e+T_bottom_tr));
```

```
P_ethanol_bottom_tr = P_ethanol_bottom_tr./760
```

P_ethanol_bottom_tr = 0.9336

```
P_butanol_top_tr = 10.^(A_b - B_b./(C_b+T_top_tr));
P_butanol_top_tr = P_butanol_top_tr./760
```

P_butanol_top_tr = 0.0948

```
P_butanol_bottom_tr = 10.^(A_b - B_b./(C_b+T_bottom_tr));
P_butanol_bottom_tr = P_butanol_bottom_tr./760
```

P_butanol_bottom_tr = 0.1841

```
% Relative Volatility Calculation
% Methanol and Ethanol
alpha_ME_top_tr = P_methanol_top_tr./ P_ethanol_top_tr
```

alpha_ME_top_tr = 1.7802

```
alpha_ME_bottom_tr = P_methanol_bottom_tr./ P_ethanol_bottom_tr
```

alpha_ME_bottom_tr = 1.6887

```
% Ethanol and Butanol
alpha_EB_top_tr = P_ethanol_top_tr./ P_butanol_top_tr
```

alpha_EB_top_tr = 5.6359

```
alpha_EB_bottom_tr = P_ethanol_bottom_tr./ P_butanol_bottom_tr
```

alpha_EB_bottom_tr = 5.0717

```
% Methanol and Butanol
alpha_MB_top_tr = P_methanol_top_tr./ P_butanol_top_tr
```

alpha_MB_top_tr = 10.0329

```
alpha_MB_bottom_tr = P_methanol_bottom_tr./ P_butanol_bottom_tr
```

alpha_MB_bottom_tr = 8.5644

```
%R = 1.9
T_bottom = 79.4
```

T_bottom = 79.4000

```
T_top= 64.8
```

```
T_top = 64.8000
```

```
P_methanol_top = 10.^(A_m - B_m./(C_m+T_top));
P_methanol_top = P_methanol_top./760
```

```
P_methanol_top = 1.0089
```

```
P_methanol_bottom = 10.^(A_m - B_m./(C_m+T_bottom));
P_methanol_bottom = P_methanol_bottom./760
```

```
P_methanol_bottom = 1.7443
```

```
P_ethanol_top = 10.^(A_e - B_e./(C_e+T_top));
P_ethanol_top = P_ethanol_top./760
```

```
P_ethanol_top = 0.5703
```

```
P_ethanol_bottom = 10.^(A_e - B_e./(C_e+T_bottom));
P_ethanol_bottom = P_ethanol_bottom./760
```

```
P_ethanol_bottom = 1.0437
```

```
P_butanol_top = 10.^(A_b - B_b./(C_b+T_top));
P_butanol_top = P_butanol_top./760
```

```
P_butanol_top = 0.1025
```

```
P_butanol_bottom = 10.^(A_b - B_b./(C_b+T_bottom));
P_butanol_bottom = P_butanol_bottom./760
```

```
P_butanol_bottom = 0.2100
```

```
% Relative Volatility Calculation
% Methanol and Ethanol
alpha_ME_top = P_methanol_top./ P_ethanol_top
```

```
alpha_ME_top = 1.7691
```

```
alpha_ME_bottom = P_methanol_bottom./ P_ethanol_bottom
```

```
alpha_ME_bottom = 1.6712
```

```
% Ethanol and Butanol
alpha_EB_top = P_ethanol_top./ P_butanol_top
```

```
alpha_EB_top = 5.5649
```

```
alpha_EB_bottom = P_ethanol_bottom./ P_butanol_bottom
```

alpha_EB_bottom = 4.9695

```
% Methanol and Butanol
alpha_MB_top = P_methanol_top./ P_butanol_top
```

alpha_MB_top = 9.8447

```
alpha_MB_bottom = P_methanol_bottom./ P_butanol_bottom
```

alpha_MB_bottom = 8.3053

```
%R=1
T_bottom = 82.3
```

T_bottom = 82.3000

```
T_top= 65.7
```

T_top = 65.7000

```
P_methanol_top = 10.^(A_m - B_m./(C_m+T_top));
P_methanol_top = P_methanol_top./760
```

P_methanol_top = 1.0452

```
P_methanol_bottom = 10.^(A_m - B_m./(C_m+T_bottom));
P_methanol_bottom = P_methanol_bottom./760
```

P_methanol_bottom = 1.9332

```
P_ethanol_top = 10.^(A_e - B_e./(C_e+T_top));
P_ethanol_top = P_ethanol_top./760
```

P_ethanol_top = 0.5930

```
P_ethanol_bottom = 10.^(A_e - B_e./(C_e+T_bottom));
P_ethanol_bottom = P_ethanol_bottom./760
```

P_ethanol_bottom = 1.1689

```
P_butanol_top = 10.^(A_b - B_b./(C_b+T_top));
P_butanol_top = P_butanol_top./760
```

P_butanol_top = 0.1074

```
P_butanol_bottom = 10.^(A_b - B_b./(C_b+T_bottom));
P_butanol_bottom = P_butanol_bottom./760
```

```
P_butanol_bottom = 0.2401
```

```
% Relative Volatility Calculation
% Methanol and Ethanol
alpha_ME_top = P_methanol_top./ P_ethanol_top
```

```
alpha_ME_top = 1.7625
```

```
alpha_ME_bottom = P_methanol_bottom./ P_ethanol_bottom
```

```
alpha_ME_bottom = 1.6538
```

```
% Ethanol and Butanol
alpha_EB_top = P_ethanol_top./ P_butanol_top
```

```
alpha_EB_top = 5.5233
```

```
alpha_EB_bottom = P_ethanol_bottom./ P_butanol_bottom
```

```
alpha_EB_bottom = 4.8689
```

```
% Methanol and Butanol
alpha_MB_top = P_methanol_top./ P_butanol_top
```

```
alpha_MB_top = 9.7348
```

```
alpha_MB_bottom = P_methanol_bottom./ P_butanol_bottom
```

```
alpha_MB_bottom = 8.0522
```