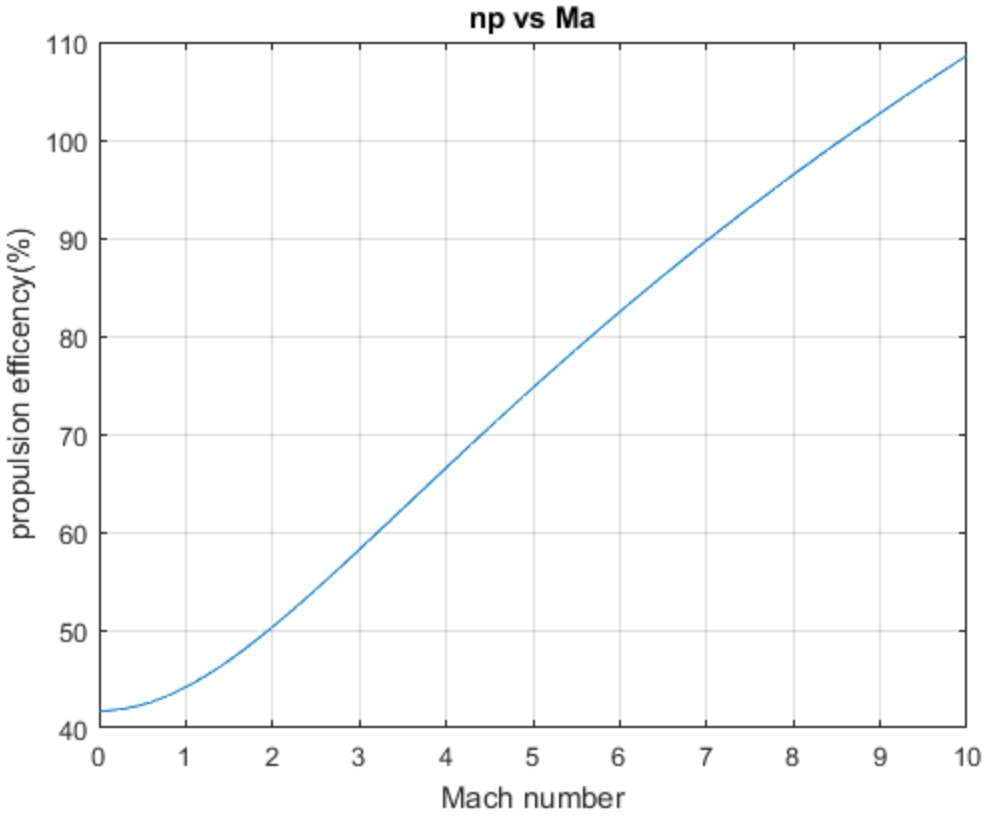
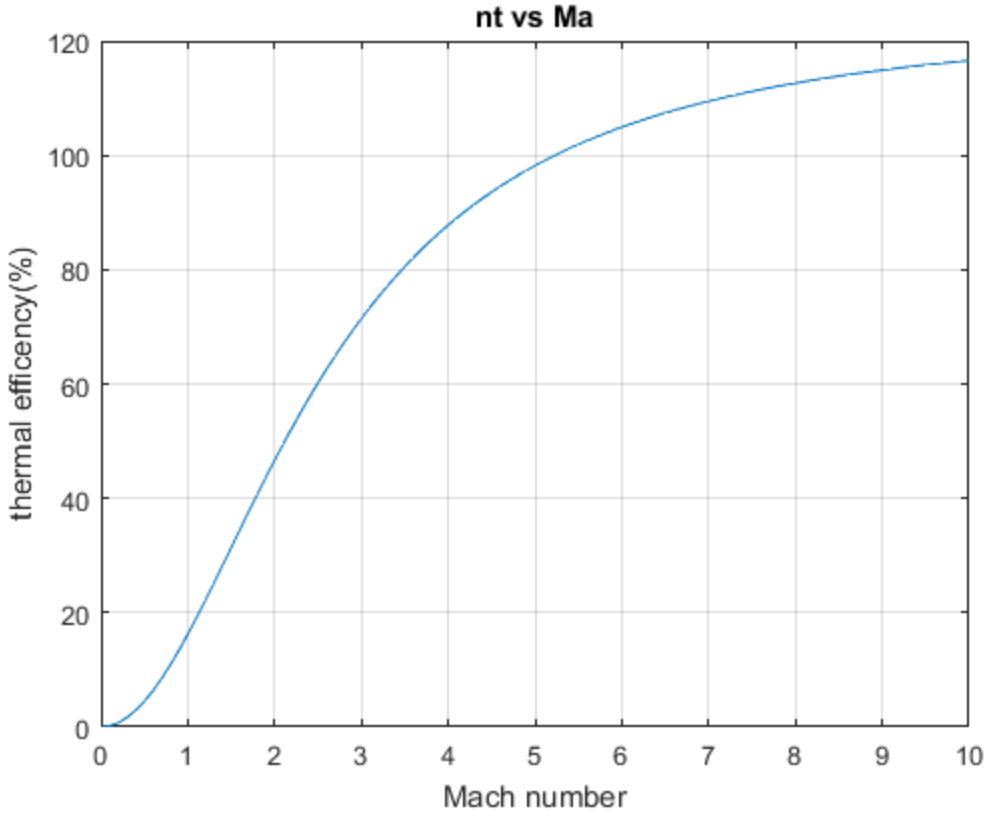
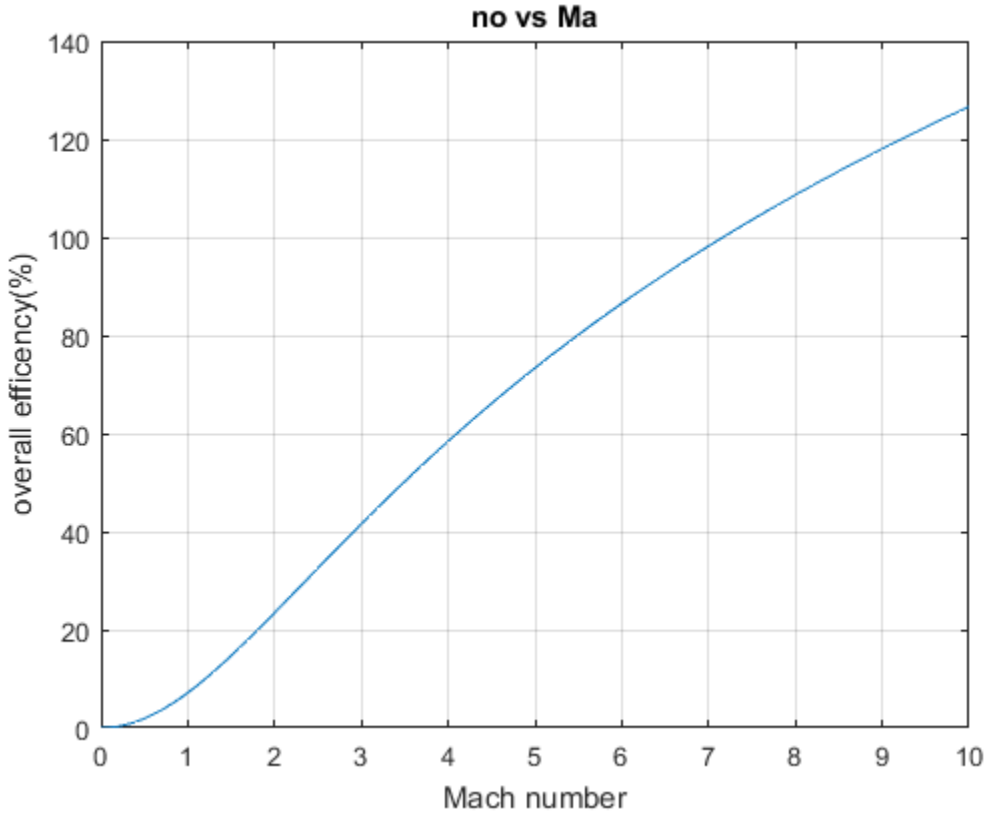
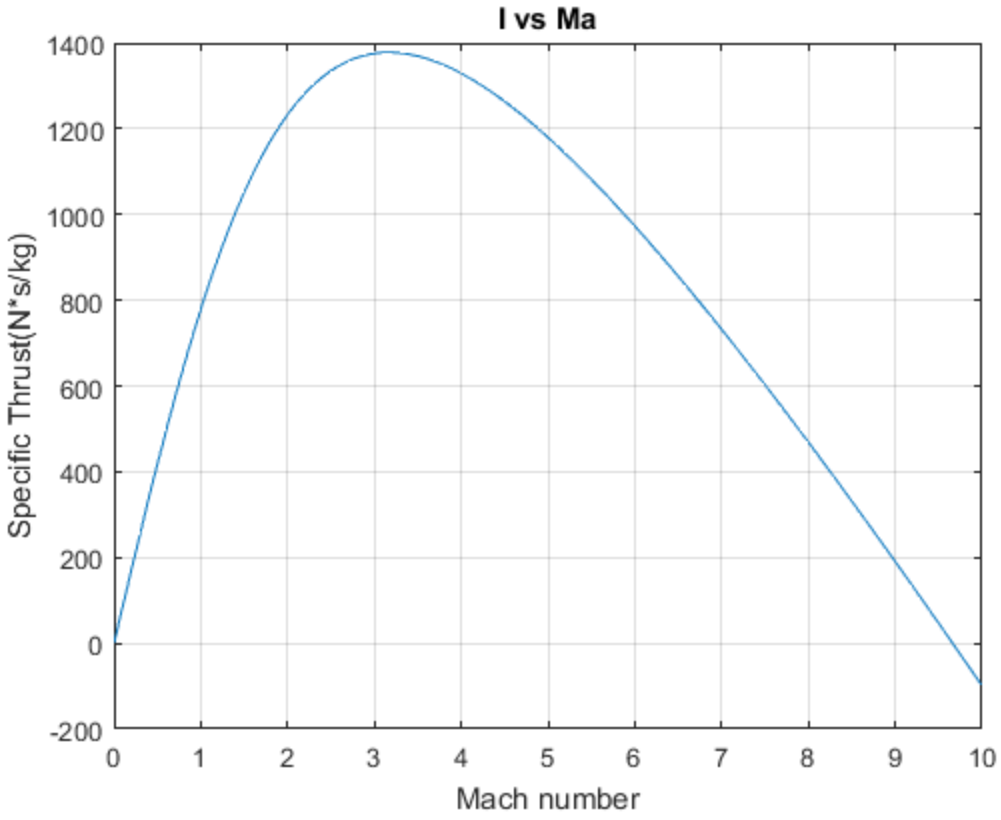
```
%MAE 423 HW#5
%Andy Perez
%Problem 1

Ma=0:0.1:10;
y=1.3;
Ta=200;    %K
To2=Ta.*(1+(((y-1)./2).*Ma.^2));
cp=1000;     %J/kgK
hc=45*10^6;  %J/kg
To4=3000;    %K
f=(To2-To4)./(To4-(hc./cp));
Tl=To4./Ta;
r=((1+(((y-1)./2).*Ma.^2))./(Tl)).^0.5;
np=(2.*r.*((1+f)-r))./(1+f-(r.^2));
Te=(Ta.*To4)./(To2);
R=287;      %J/kg*K
Ue=Ma.*((y.*R.*Te).^.5);
nt=((1+f)-r.^2)./((2.*f.*hc)./(Ue.^2));
no=np.*nt;
Ua=Ma.*((y.*R.*Ta).^.5);
I=(((1+f)./(r))-1).*Ua;

%np2=(2.*(Ua./Ue))./(1+(Ua./Ue));
%nt2=(0.5.*((Ue.^2)-(Ua.^2)))./(cp.*(To4-To2));
%no2=np2.*nt2;



figure
plot(Ma,np.*100)
xlabel('Mach number')
ylabel('propulsion efficency(%)')
title('np vs Ma')
grid on;

figure
plot(Ma,nt.*100)
xlabel('Mach number')
ylabel('thermal efficency(%)')
title('nt vs Ma')
grid on;

%figure
%plot(Ma,nt2.*100)



figure
plot(Ma,no.*100)
xlabel('Mach number')
ylabel('overall efficency(%)')
```

```
title('no vs Ma')
grid on;

figure
plot(Ma,I)
xlabel('Mach number')
ylabel('Specific Thrust(N*s/kg)')
title('I vs Ma')
grid on;
```




nt vs Ma
thermal efficency(%)
Mach number
0
20
40
60
80
100
120
0
1
2
3
4
5
6
7
8
9
10


no vs Ma
overall efficency(%)
Mach number
0
20
40
60
80
100
120
140
0
1
2
3
4
5
6
7
8
9
10



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