Table of Contents


```
clear all
close all
clc

% SEAS 1001 - Matlab Assignment 3A
% RICK SEAR
```

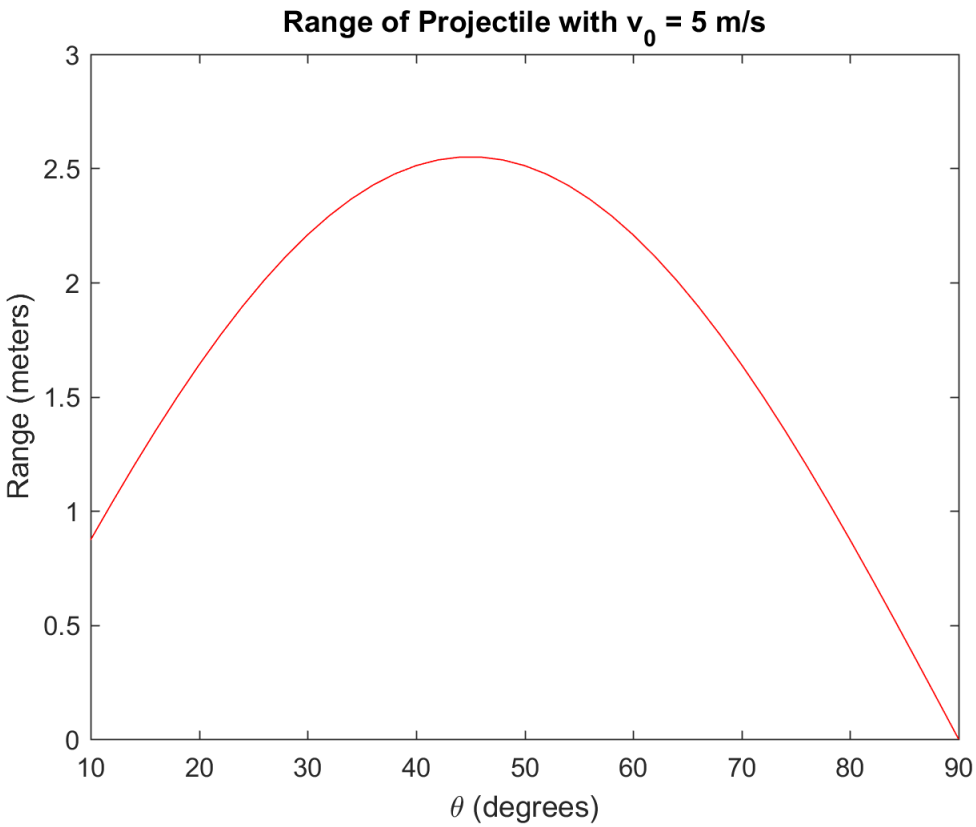
Problem 1

```
t = [10:2:90];
v0 = 5;
g = 9.8;

R = (v0).^2 * sind(2*t)./g;
```

Problem 2

```
plot(t,R,'r')
xlabel('\theta (degrees)')
ylabel('Range (meters)')
title('Range of Projectile with v_0 = 5 m/s')
```



Problem 3

```
max(R) % Prints maximum range of projectile
```

```
ans =

    2.5495
```

Problem 4

```
[Y,I] = max(R);
t(1,I) % Prints value of theta necessary to reach maximum range
```

```
ans =

    44
```

Problem 5

```
H = (v0).^2 * ((sind(t)).^2)./(2.*g);
```

```
plot(t,H,'b')
xlabel('\theta (degrees)')
ylabel('Height (meters)')
title('Height of Projectile with v_0 = 5 m/s')

max(H) % Prints maximum height of projectile

[Y,J] = max(H);
t(1,J) % Prints value of theta necessary to reach maximum height
```

```
ans =

    1.2755
```

```
ans =

    90
```

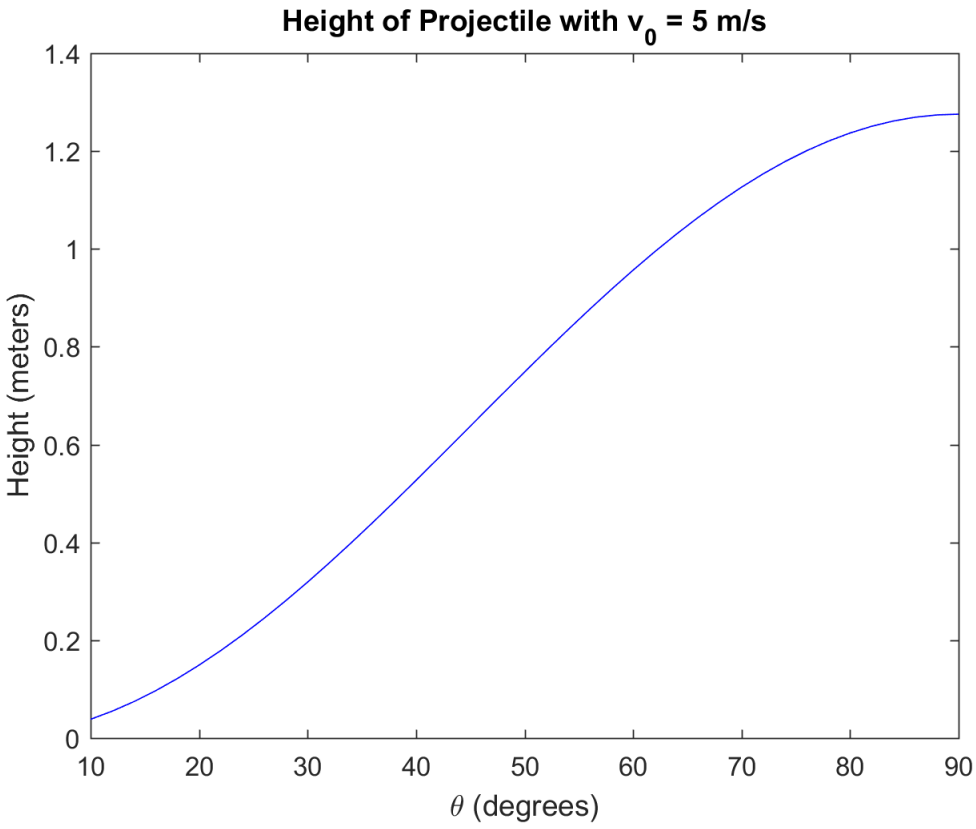


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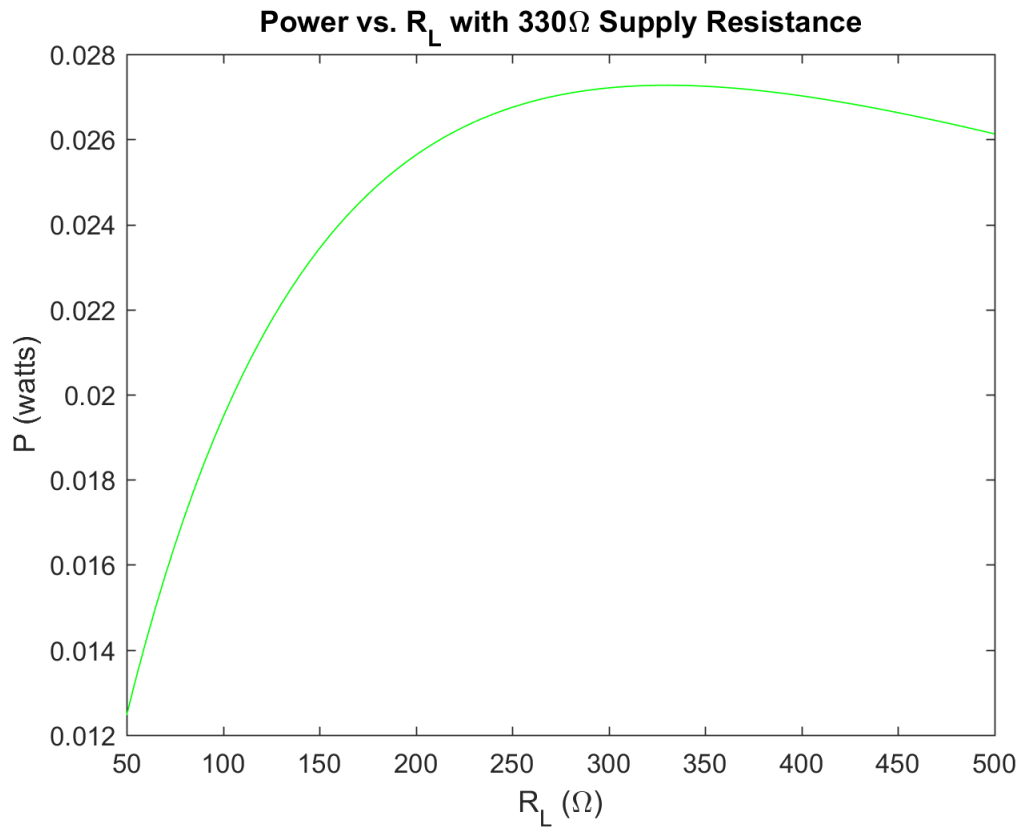
Table of Contents


```
clear all
close all
clc

% SEAS 1001 - Assignment 3B
% RICK SEAR
```

Problem 1

```
Vs = 6;
Rs = 330;
Rl = [50:5:500];
P = ((Vs)./(Rs+Rl)).^2 .*Rl;

plot(Rl,P,'g')
xlabel('R_L (\Omega)')
ylabel('P (watts)')
title('Power vs. R_L with 330\Omega Supply Resistance')

max(P) % Prints the maximum power
[Y,I] = max(P);
Rl(1,I) % Prints the value of R_L which yields the maximum power
```

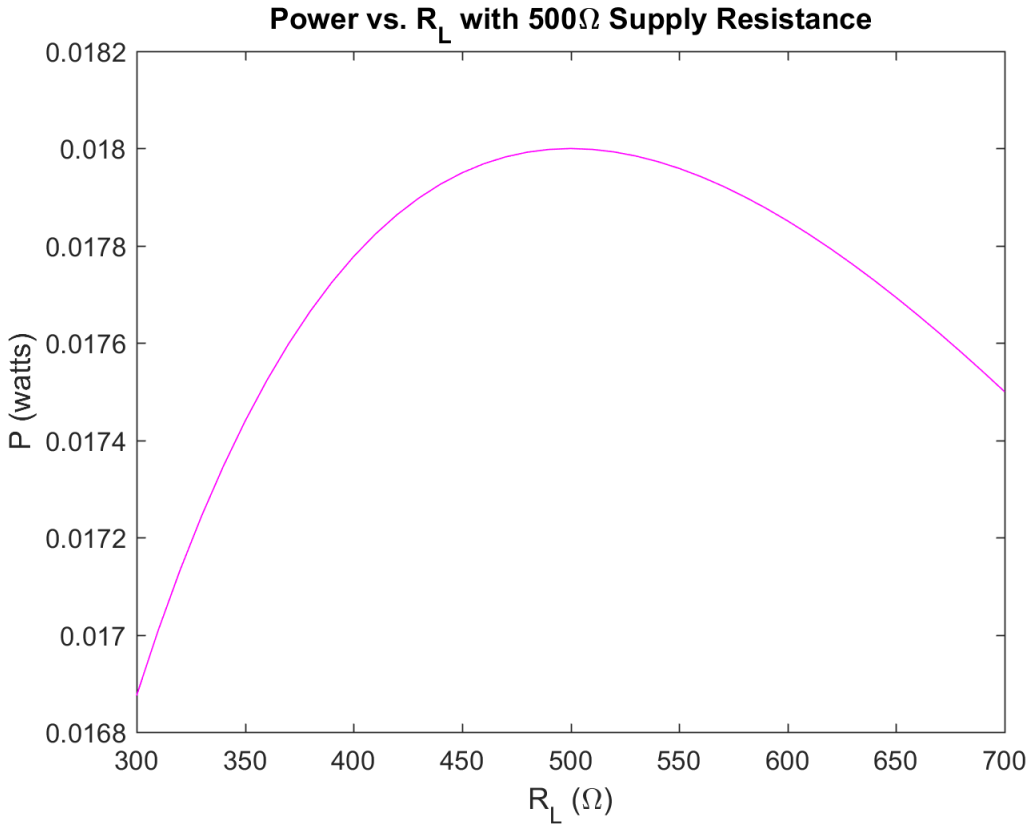
```
ans =

    0.0273


ans =

   330
```



Problem 2

```
Rl = [300:10:700];
Rs = 500;

P = ((Vs)./(Rs+Rl)).^2 .*Rl;

plot(Rl,P,'m')
xlabel('R_L (\Omega)')
ylabel('P (watts)')
title('Power vs. R_L with 500\Omega Supply Resistance')
axis([300 700 0.0168 0.0182])

max(P) % Prints the maximum power
[X,J] = max(P);
Rl(1,J) % Prints the value of R_L which yields the maximum power
```

```
ans =

    0.0180


ans =

   500
```



Problem 3

```
%   As supply resistance increases, the load resistance
%   necessary to reach maximum power also increases.
```

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Table of Contents


```
clear all
close all
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% SEAS 1001 - Assignment 3C
% RICK SEAR
```

Problem 1

```
% Below is the formula derived for the volume of the box
% It is commented out because x is not defined in Problem 1

% V = 4*x.^3 - 140*x.^2 + 1000*x
```

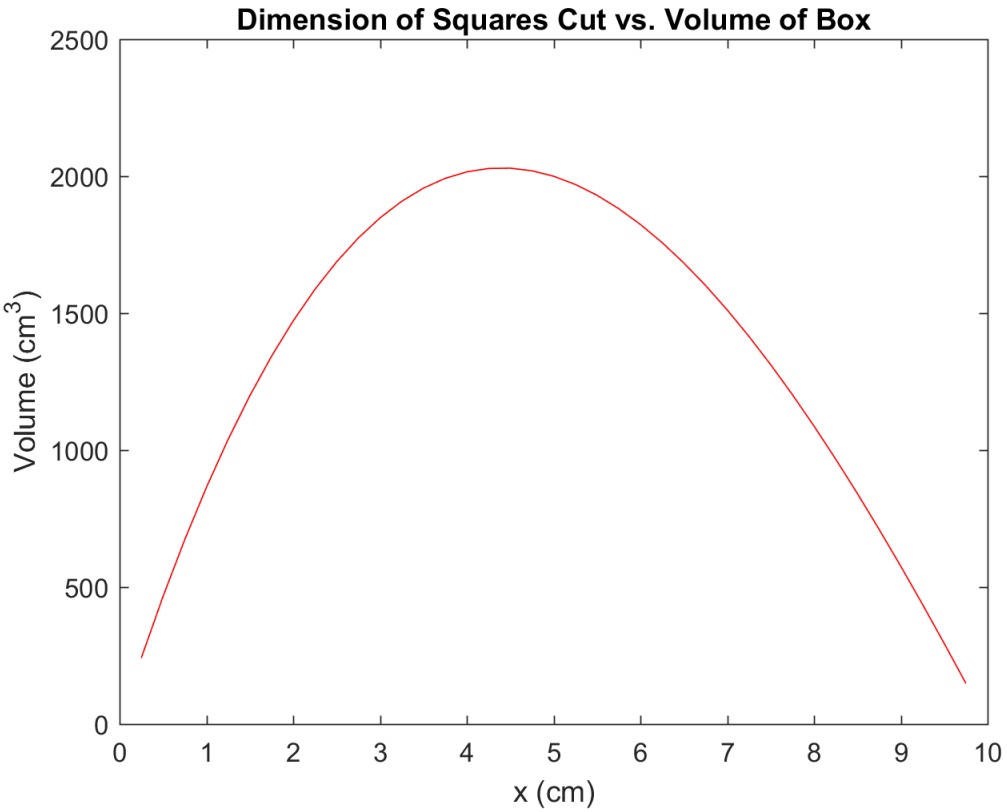
Problem 2

```
x = [0.25:0.25:9.75];

V = 4*x.^3 - 140*x.^2 + 1000*x;
```

Problem 3

```
plot(x,V,'r')
xlabel('x (cm)')
ylabel('Volume (cm^3)')
title('Dimension of Squares Cut vs. Volume of Box')
```



Problem 4

```
max(V) % Prints maximum volume
```

```
ans =

   2.0295e+03
```

Problem 5

```
[Y,I] = max(V);

% Code below prints length, width, and height of most voluminous box
l = 50 - 2.* x(1,I)
w = 20 - 2.* x(1,I)
h = 1.* x(1,I)
```

```
l =

    41
```

```
w =

    11

h =

    4.5000
```

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