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## Table of Contents

.....	1
Plane with Generation .....	1
Falling Again .....	2
Radiation .....	3
2D Slab .....	4

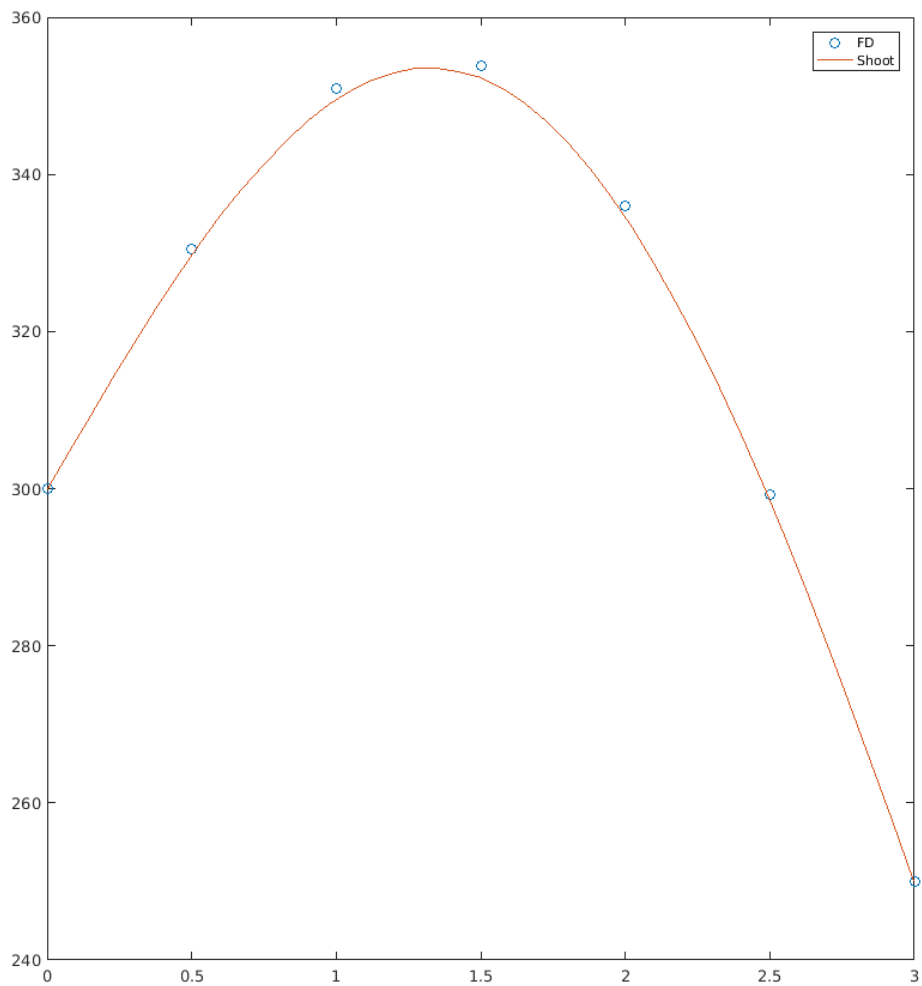
% Cory Wolfe

## Plane with Generation

```
x = .5:.5:2.5;
b = -5000*sin(x)*.5^2/60;
b(1) = b(1)-300;
b(end) = b(end) -250;
A = gallery('tridiag',ones(4,1),-2*ones(5,1),ones(4,1));
T = A\b'
plot(x,T)
x = [0,x,3]; T=[300;T;250];
[xs,Ts] = ode45(@d2Tdx2, [0 3],[300 62.7467]);
plot(x,T,'o',xs,Ts(:,1)), legend('FD','Shoot')
```

$T =$

```
330.4603
350.9325
353.8742
336.0346
299.2514
```



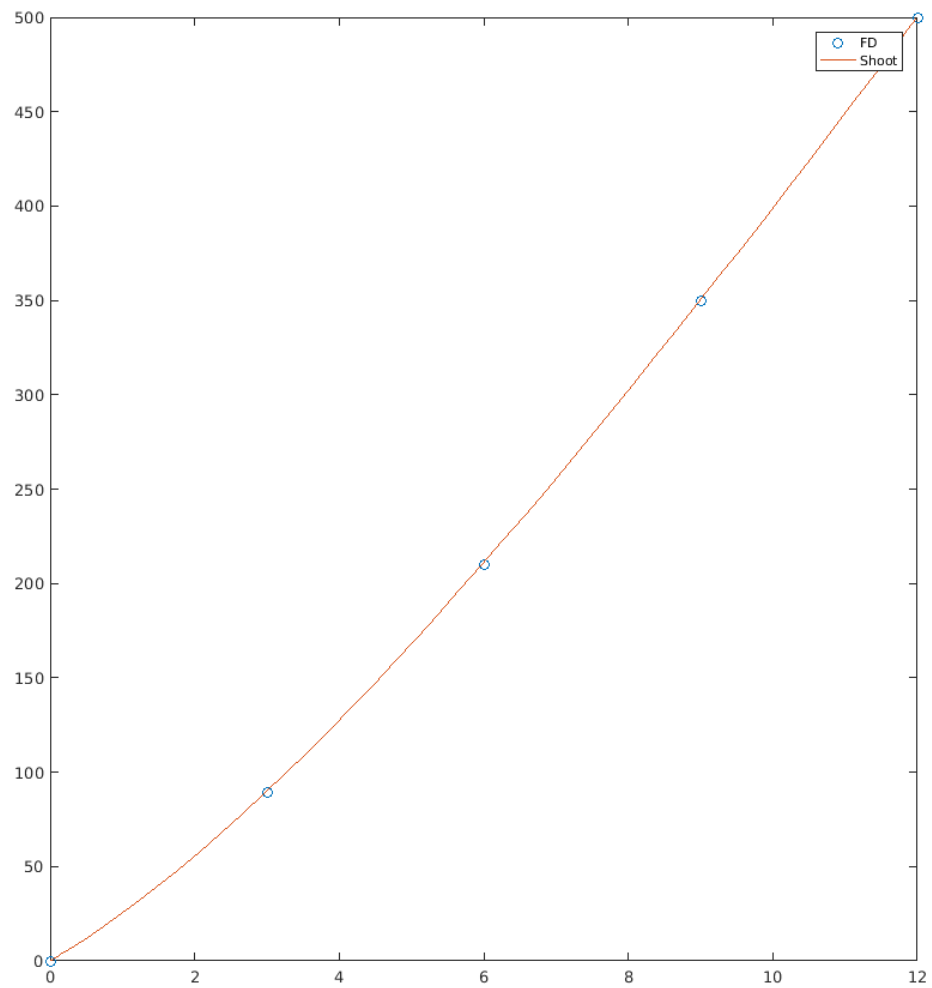
## Falling Again

```
dt = 3;g=9.81;c=12.5;m=70;
b = g*dt^2*ones(3,1);
b(1) = b(1)-0;
b(end) = b(end) - (1+c*dt/(2*m))*500;
C = (1-c*dt/(2*m))*ones(2,1);
D = -2*ones(3,1);
E = (1+c*dt/(2*m))*ones(2,1);
A3 = gallery('tridiag',C,D,E);
x = A3\b
t=0:dt:12; x=[0;x;500];
[ts,xs] = ode45(@falling, [0 12],[0 22.7224]);
plot(t,x, 'o',ts,xs(:,1)), legend('FD', 'Shoot')
```

---

$x =$

89.1092  
210.2038  
349.7689



## Radiation

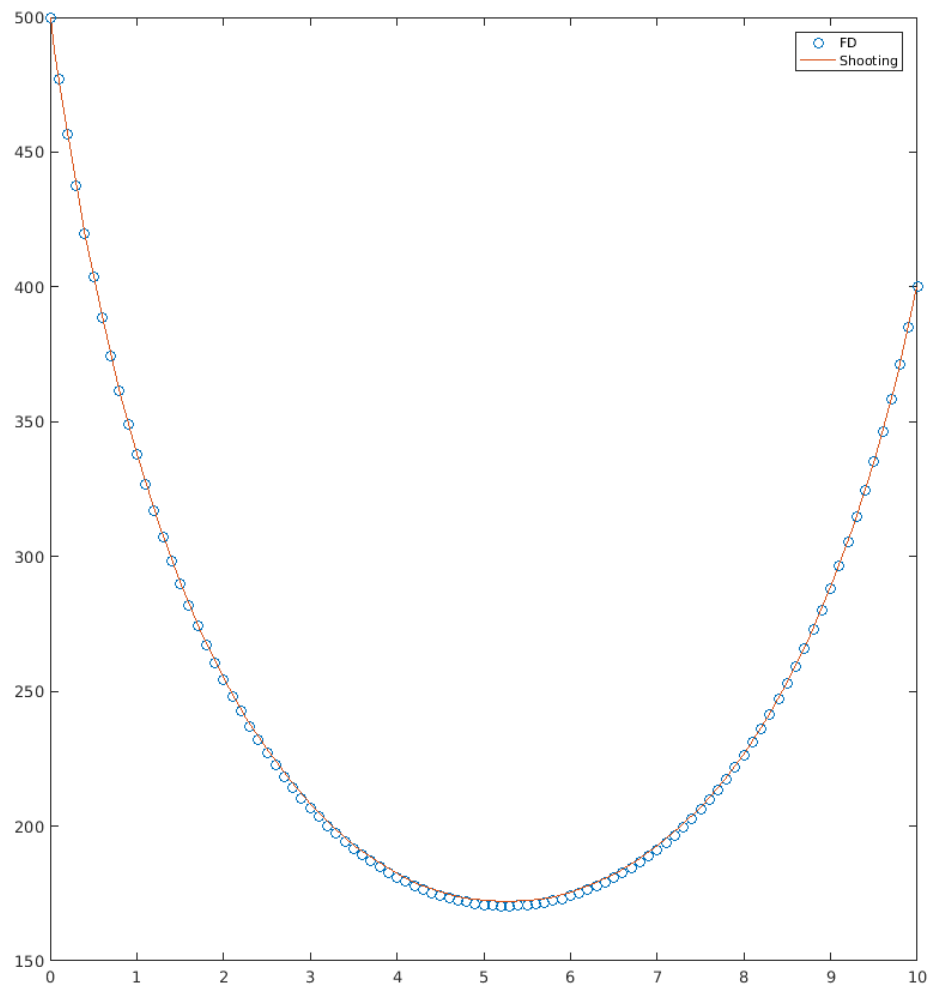
```
dx=.1; x=0:dx:10; n=length(x);  
Tinf=100; h=0.15; s=2.7e-9;  
T = zeros(n,1); T(1)=500; T(end)=400;  
T = raditer(T,Tinf,dx,h,s);  
while(1)  
    Told=T;  
    T=raditer(T,Tinf,dx,h,s);
```

---

```

    ea=max(abs((T-Told)/T)*100);
    if ea<0.001, break, end
end
za = fzero(@res1,-60);
[xs,Ts]=ode45(@radiation,[0 10],[500 za]);
plot(x,T,'o',xs,Ts(:,1))
legend('FD','Shooting')

```



## 2D Slab

```

A = zeros(8);
A(1,1)=-4; A(1,2)=1; A(1,5)=1;
A(2,1)=1; A(2,2)=-4; A(2,3)=1; A(2,6)=1;
A(3,2)=1; A(3,3)=-4; A(3,4)=1; A(3,7)=1;
A(4,3)=2; A(4,4)=-9; A(4,8)=1;
A(5,1)=2; A(5,5)=-4; A(5,6)=1;

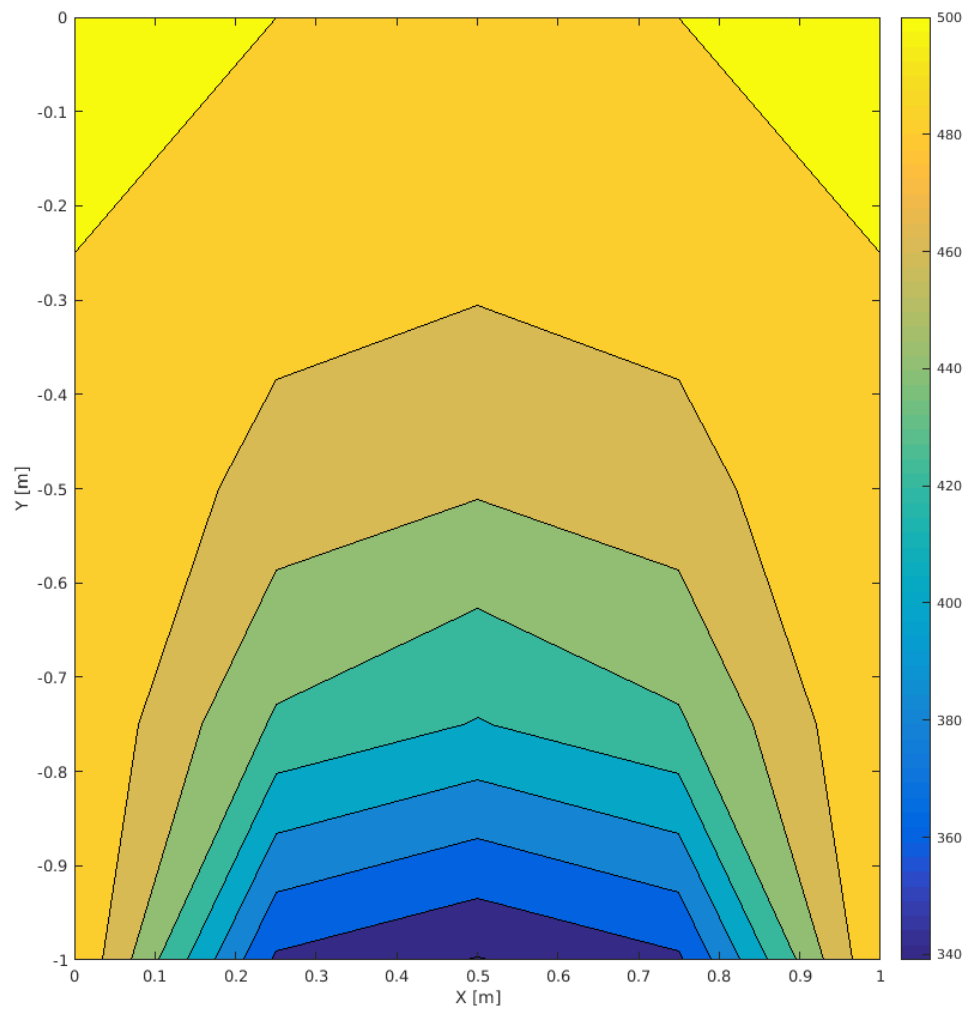
```

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```
A(6,2)=2; A(6,5)=1; A(6,6)=-4; A(6,7)=1;
A(7,3)=2; A(7,6)=1; A(7,7)=-4; A(7,8)=1;
A(8,4)=2; A(8,7)=2; A(8,8)=-9;
b=-500*[2;1;1;4;1;0;0;3];
T = A\b
x=0:0.25:1; y=x;
[X,Y]=meshgrid(x,y);
Tplot=zeros(5);
Tplot(:,1)=500;Tplot(:,5)=500;Tplot(1,:)=500;
Tplot(2:5,2)=T(1:4);Tplot(2:5,4)=T(1:4);
Tplot(2:5,3)=T(5:8);
contourf(X,-Y,Tplot)
colorbar
xlabel('X [m]'), ylabel('Y [m]')
```

```
T =
```

```
489.3047
472.0651
436.9498
356.9946
485.1538
462.0058
418.7393
339.0520
```



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