

```

function dy=reliablemultiple(t, y)
global Q M l u
Q=1; l=0.15; u(1)=1.1; u(2)=1.2;

dy=zeros(2*M+1,1);
dy(1)=-(M*l)*y(1)+u(1)*y(M+2);
n=1;
for j=2:M
    dy(j) = -(Q+(M-n)*l)*y(j) + (M-n+1)*l*y(j-1);
    n=n+1;
end
dy(M+1) = -Q*y(M+1)+l*y(M);
dy(M+2) = -((M-1)*l+u(1))*y(M+2) +u(2)*y(M+3)+ Q*y(2);
n=2;
for j=M+3:2*M
    u(n)=1+(n/10); u(n+1)=1+((n+1)/10);
    dy(j) =-((M-n)*l+u(n))*y(j)+(M-n+1)*l*y(j-1)+u(n+1)*y(j+1)+Q*y(j-(M+1));
    n=n+1;
end
dy(2*M+1)=-(u(M))*y(2*M+1)+l*y(2*M+1-1)+Q*y(M+1);

```

The Script to solve the code above

```

tic
clear all
global M
M = 100;
y0 = zeros(2*M+1,1);
y0(1)=1;
T1=[0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19,
20];
T=length(T1);
[t, y]=ode45('reliablemultiple',T1, y0);
for i=1:T;
    y(i, :);
end
for i=1:T;
    sum(y(i, :));
end
% Normalization
for i=1:T;
    p(i, :)=y(i, :)/sum(y(i, :));
end
for i=1:20;
    sum(p(i, :));
end
Expectednooffailedmachine(1)=0
Expectednoofoperatingmachine(1)=M-Expectednooffailedmachine(1)

sum1=0;
sum2=0;
sum3=0;
for i=1:T
for j=1:M+1;
    sum1=sum1+p(i, j)*(j-1);

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end
for j=M+2:2*M+1;
    sum2=sum2+p(i, j)*(j-(M+1));
end
for j=1:M+1;
    sum3=sum3+p(i, j);
end
Expectednooffailedmachine(i)=sum1+sum2
Expectednoofoperatingmachine(i)=M-Expectednooffailedmachine(i)
Expectednoofvacation(i)=sum3
Expectedidleperiod(i)=0
Machineavailability(i)=1-(Expectednooffailedmachine(i)/M)
Expectedbusyperiod(i)=1-Expectedidleperiod(i)-Expectednoofvacation(i)
sum1=0;
sum2=0;
sum3=0;
end

```

```

v=var(Expectednooffailedmachine)
u=var(Expectednoofoperatingmachine)
std=sqrt(v)
toc

```