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tic
clear all
global M
M = 10;
y0 = zeros(3*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('multiplevacation',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:T;
    sum(p(i, :));
end
Expectednooffailedmachine(1)=0
Expectednoofoperatingmachine(1)=M-Expectednooffailedmachine(1)

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sum1=0;
sum2=0;
sum3=0;
for i=1:T
for j=1:M+1;
    sum1=sum1+p(i, j)*(j-1);
end
for j=M+2:2*M+1;
    sum2=sum2+p(i, j)*(j-(M+1));
end
for j=2*M+2:3*M+1;
    sum3=sum3+p(i, j)*(j-(2*M+1));
end
Expectednooffailedmachine(i)=sum1+sum2+sum3
Expectednoofoperatingmachine(i)=M-Expectednooffailedmachine(i)
Machineavailability(i)=1-(Expectednooffailedmachine(i)/M)
sum1=0;
sum2=0;
sum3=0;
end

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    sum4=0;
    sum5=0;
for i=1:T;
    for j=1:M+1;
        sum4=sum4+p(i, j);
    end
    for j=2*M+2:3*M+1;
        sum5=sum5+p(i, j);
    end
end

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        end
        Expectednoofvacation(i)=sum4
        Expectedbrokenserver(i)=sum5
        Expectedidleperiod(i)=0
        Expectedbusyperiod(i)=1-Expectedbrokenserver(i)-Expectedidleperiod(i)-
Expectednoofvacation(i)
        sum4=0;
        sum5=0;
    end
    v=var(Expectednooffailedmachine)
    u=var(Expectednoofoperatingmachine)
    std=sqrt(v)
    toc

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