
```
clear, clc;
close all;

%problem 3

%3A
%declare and initialize variables
n = 8;
a = ones(1,n);
b = -2.*ones(1,n);
c = -5.*ones(1,n);
d = -1.*ones(1,n);
e = ones(1,n);
f = [-5 -7 -6 -6 -6 -6 -7 -6];

z = pent(a,b,c,d,e,f,n)

function x = pent(a,b,c,d,e,f,n)

%     initial condition 1
cbar(1) = c(1);
dbar(1) = d(1);
ebar(1) = e(1);
fbar(1) = f(1);

%     initial condition 2
bbar(2) = b(2);
cbar(2) = c(2);
dbar(2) = d(2);
ebar(2) = e(2);
fbar(2) = f(2);

%     downward elimination for a
for i = 3:n
    multiplier = a(i)/bbar(i-1);
    abar(i) = a(i)-multiplier*bbar(i-1);
    bbar(i) = b(i)-multiplier*cbar(i-1);
    cbar(i) = c(i)-multiplier*dbar(i-1);
    dbar(i) = d(i)-multiplier*ebar(i-1);
    ebar(i) = e(i);
    fbar(i) = f(i)-multiplier*fbar(i-1);
end

%     downward elimination for b
for i = 2:n
    multiplier2 = bbar(i)/cbar(i-1);
    bbar(i) = bbar(i)-multiplier2*cbar(i-1);
    cbar(i) = cbar(i)-multiplier2*dbar(i-1);
    dbar(i) = dbar(i)-multiplier2*ebar(i-1);
    ebar(i) = e(i);
    fbar(i) = fbar(i)-multiplier2*fbar(i-1);
end
```

```

%   preallocate x
x = ones(1,n);

%   initial conditions for upward substitution
x(n) = fbar(n)/cbar(n);
x(n-1) = (fbar(n-1)-(dbar(n-1)*x(n)))/cbar(n-1);

%   upward substitution
for i = n-2:1
    x(i) = (fbar(i)-ebar(i)*x(i+2)-dbar(i)*x(i+1))/cbar(i);
end
end

z =

Columns 1 through 7

    1.0000    1.0000    1.0000    1.0000    1.0000    1.0000    1.0000

Column 8

    1.0000

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