```matlab
%pmeth
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%PHYS 428
%This program finds eigenvector and dominant eigenvalue of matrix A
%v2 is the leading eigenvector, v1 follows, and so on
%tolVec is convergence tolerance for the vector, tolVal--the value
%c2 is leading 'convergence' as defined on page 280 of A Friendly ✓
Introduction to
%Numerical Analysis--it is  "an estimate for the asymptotic rate of linear ✓
convergence" of the sequence towards the dominant eigenvalue
%c1 follows c2
A = [1 4 5; 4 -3 0; 5 0 7];
v00 = ones(3,1);
v0 = ones(3,1);
v1 = ones(3,1);
v2 = ones(3,1);
v1 = (1/sqrt(3))*v1;
tolVec = 1;
tolVal = 1;
n = 0;
format long
%change tolVec to tolVal to evaluate convergence of the eigenvalue
while tolVec> 5*10^-5
    n=n+1;
    v2 = A*v1;
    c2 = (v2(3,1)-v1(3,1))/(v1(3,1)-v0(3,1));
    c1 = (v1(3,1)-v0(3,1))/(v0(3,1)-v00(3,1));
    tolVec = abs(c2-c1);
    tolVal = abs((v2(3,1)/v1(3,1))-(v0(3,1)/v00(3,1)));
    v00 = v0;
    v0 = v1;
    v1 = v2;
end
domEig = v2(3,1)/v1(3,1)
n
```

tolVec
tolVal
v2