```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
```