Dobbs2

```
A=[-2i -7 5 6 5 4 4 -6;
    10 3 1 3 -4 7 6 1;
    -2 6 -4 7 10 -2 0 7;
    -10 5 -1 7 9 7 -8 -8;
    -10 5 -10 -5 4 -7 1 -1;
    -5 -6 -2 -1 8 2 9 -7;
    -6 6 -10 -5 10 0 9 -10;
    7 9 0 -1 9 -8 -7 -3];
b=[3; -7; -3; 3; -5; -6; -7; 7];

[Q,H] = arnoldi_iteration(A,b)
```

```
Q = 8×4 complex
  0.195698421916033 + 0.000000000000000i -0.352594068530679 - 0.021302689223294i ···
 -0.456629651137410 + 0.000000000000000i  0.090505009303388 - 0.001979453423403i
 -0.195698421916033 + 0.000000000000000i  0.090473589407779 - 0.000848337181459i
  0.195698421916033 + 0.000000000000000i -0.577796170312327 + 0.000848337181459i
 -0.326164036526721 + 0.000000000000000i  0.020344382407201 - 0.001413895302431i
 -0.391396843832065 + 0.000000000000000i -0.284224375684239 - 0.001696674362917i
 -0.456629651137410 + 0.000000000000000i -0.596176809243929 - 0.001979453423403i
  0.456629651137410 + 0.000000000000000i -0.297247922414408 + 0.001979453423403i
H = 4×3 complex
  9.502127659574468 - 0.076595744680851i  5.909491261884984 + 0.067932207414572i ···
 17.669467621062331 + 0.000000000000000i -5.149445439931762 - 0.519845392968218i
  0.000000000000000 + 0.000000000000000i 15.601088497604891 + 0.000000000000000i
  0.000000000000000 + 0.000000000000000i  0.000000000000000 + 0.000000000000000i
```

```
function [Q,H] = arnoldi_iteration(A, b) % algo 33.1
    Q(:,1) = b/norm(b);
    for n=1:4  % Krylov subspace K_4
        v = A*Q(:,n);
        for j=1:n
            H(j,n) = Q(:,j)' * v;
            v = v - (H(j,n) * Q(:,j));
        end
        H(n+1,n) = norm(v);
        Q(:,n+1) = v/H(n+1,n);
    end
end
```