Eigenvalue Power Method\textsuperscript{1}

1. Enter the following sequence of commands:
   \begin{verbatim}
   format long
   A = hilb(5);
   m = eig(A)
   v = ones(5,1)
   w = v./norm(v);
   \end{verbatim}

2. Next enter the following sequence:
   \begin{verbatim}
   v = A*w;
   w = v./norm(v);
   ma = w'*A*w
   \end{verbatim}

3. Repeat the steps in part 2 until the value of $ma$ stops changing. How many iterations did it take? Is this number close to one of the eigenvalues? How close?

4. Repeat the above experiment for the Pascal matrix generated by: $A = \text{pascal}(5)$.

5. Repeat the experiment for a larger matrix.

6. Using complete sentences and standard mathematical notation, write a brief report.

This demonstrates the simplest form of the QR method. Most modern software including MATLAB’s built-in function “eig” use improved versions of this algorithm.

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