Rayleigh Quotient Iteration

Describe Rayleigh Quotient Iteration.

\[ A = x^\top \sigma x \]

**Demo:** Power Iteration and its Variants [cleared]
In-class activity: Eigenvalues
Schur form

Show: Every matrix is orthonormally similar to an upper triangular matrix, i.e. \( A = QUQ^T \). This is called the Schur form or Schur factorization.

\[
A v = \lambda v \quad V = \text{span}\{\vec{v}\}
\]

\[
A : V \to V \\
\vdash V^\perp \to V \oplus V^L
\]

\[
A = \begin{pmatrix}
1 & \text{Basis of } V^L \\
\vdash V^\perp \\
Q
\end{pmatrix}
\begin{pmatrix}
\lambda & 0 \\
0 & \Theta
\end{pmatrix}
\begin{pmatrix}
Q^{-T} \\
\end{pmatrix}
\]
Schur Form: Comments, Eigenvalues, Eigenvectors

\[ A = QUQ^T. \] For complex \( \lambda \):

- Either complex matrices, or
- \( 2 \times 2 \) blocks on diag.

If we had a Schur form of \( A \), how can we find the eigenvalues?

And the eigenvectors?