Recitation 6

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Etymology

- *eigen*values and *eigen*vectors
- What does *eigen* mean anyway?
- German word for...
    1. own
    2. innate
    3. peculiar
    4. **intrinsic**
- A square matrix 'owns' certain vectors... or there are certain vectors that are intrinsic to a matrix.

Importance of Eigenvalues and Eigenvectors

!!! ***SERIOUSLY IMPORTANT*** !!!

- Eigen-val/vec will show up *continuously* throughout this course
- Connections to...
  - Projections and Orthogonal Projections (Lec 4)
  - Markov Chains (Lec 6)
  - Spectral Theorem (HW 6, Lec 7)
  - SVD (Lec 7)
  - Spectral Clustering (!!??) (Lec 8)
  - Positive definite and positive semi-definite matrices (Lec 10,11)
- Many other applications not covered in this course
- Literally cannot stress this enough

$Av = \lambda v$. So what's the big deal?

- Square matrices are important enough to get their own name - *operators*.
- Sometimes a matrix A 'prefers' certain directions
- These directions are useful 'anchors' to understanding what a matrix does.
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