# Eigenvalues and eigenvectors

- Eigenvalues and eigenvectors
- Important matrix properties
  - Hermitian, orthogonality,...
- Eigenvalue algorithm
  - Power iteration, a simple numerical algorithm producing a number $\lambda$, the greatest (in absolute value) eigenvalue of a matrix $A$, and the corresponding eigenvector $v$, such that $Av=\lambda v$.
  - LR algorithm, developed by Heinz Rutishauser (1958 ?)
  - QR algorithm

## Applications

- collisional relaxation
- population dynamics, evolution (stationary population pyramid)
- normal modes analysis (molecular vibrations)
- PCA (principal component analysis)
- Schrödinger equation in quantum mechanics, molecular orbitals (Hartree–Fock theory)

## Python libraries

## References