

# Evaluation Task: Machine Learning for Turbulent Fluid Dynamics

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Complete the following tasks related to linear algebra in an ipython notebook, and submit it via email within seven (7) days.

1. Generate a  $10 \times 10$  symmetric matrix with real-valued but random matrix elements between -1.0 and 1.0
2. Make a graphic visualization of the matrix using a color scale.
3. Find the eigenvectors / values of the matrix.
4. Create an approximation to the matrix by recreating it using only the two eigenvectors with the largest absolute eigenvalue.  
(See: [https://en.wikipedia.org/wiki/Schmidt\\_decomposition](https://en.wikipedia.org/wiki/Schmidt_decomposition)).
5. Make a graphic visualization of the approximate matrix, and compare it to the original matrix.
6. Repeat steps 4 and 5 above, but now use the four eigenvectors with the largest absolute eigenvalue.