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HW 1 Report

2.

The PageRank Method seems to be the fairest way to rank the candidates. It takes each rank into account rather than only the first-place candidate as does the Plurality method. Compared to the Borda Method and the W-Borda Method it is not quite so arbitrary as it uses the eigenvectors that come from the different wins and losses.

3.

SVD Method:

After computing the Singular Value Decomposition of the exam scores matrix, we take the rank one approximation of the SVD by creating the first rank one matrix

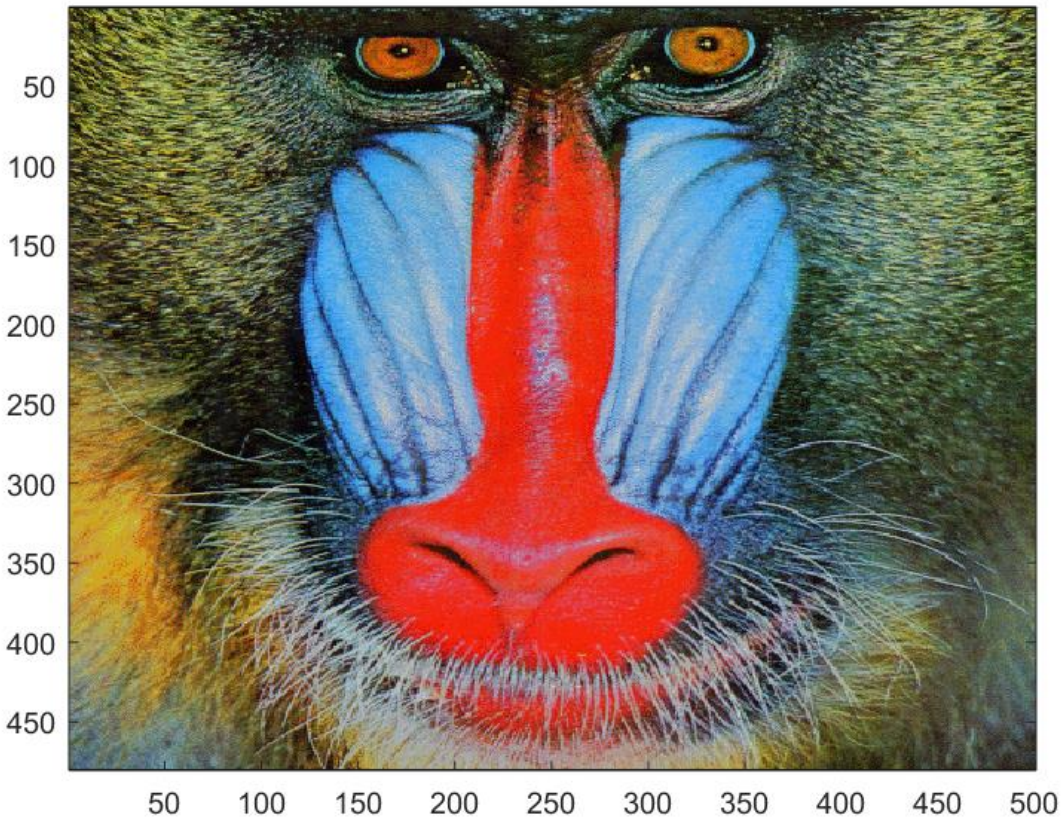
$$\sigma_1 M_1 = \sigma_1 p_1 q_1^{\,t}$$

When using this biggest singular value, we can then find the six other M_j from a linear combination of M_1 .

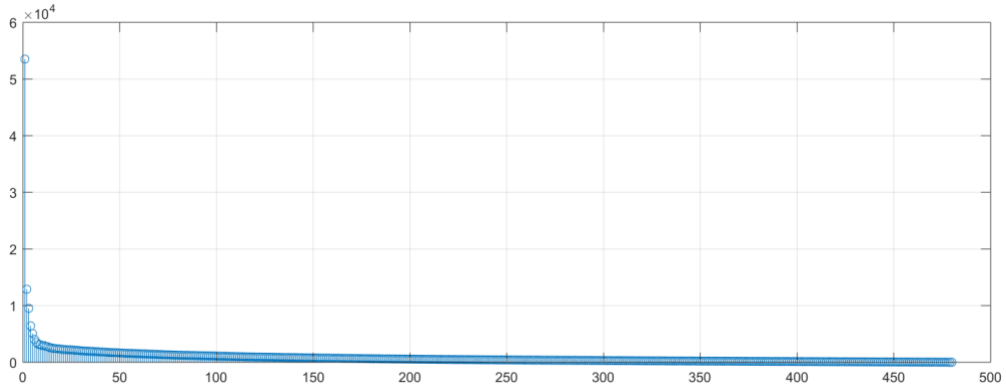
Massey's Network Method:

We create a node-arc incidence mapping (network) for each game played. In this scenario we create a network for each student where each node represents a question and a game represents a pairwise comparison of two unique questions. 31 students and 6 pairwise comparisons totaled to 186 games. We constructed a Massey matrix that assigns a "1" to paths from question *i* to question *j* when *i* received fewer points than question *j* and we assign a "-1" to the vice versa. Ties are denoted as zero. We used *linsolve* to compute the solution for the normal equation and return a rank to each question.

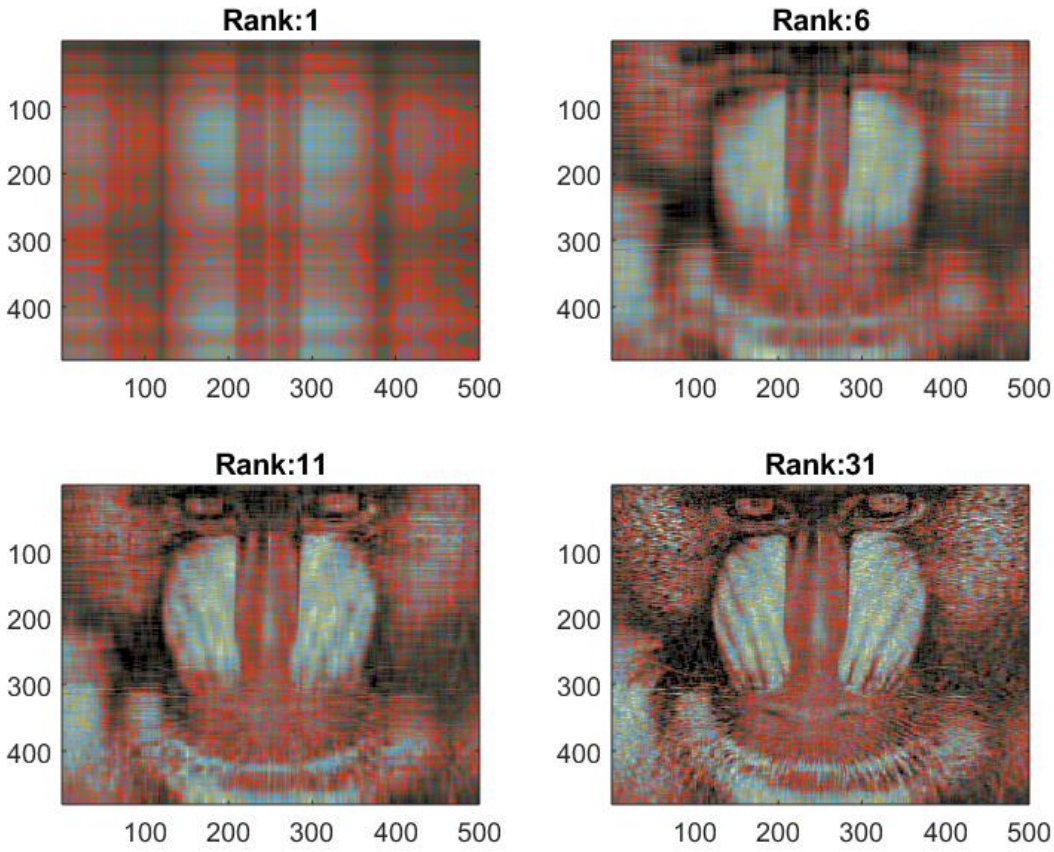
4.



Singular Values



Rank Approximations



Residues of Rank Approximations