Problem Set 5

Problems on topics related to eigenvalues and eigenvectors

Textbook: G. Strang "Linear Algebra and its applications", 4th edition

Problem Set	Problem Numbers
5.2	2, 7, 16, 34, 36
5.3	1, 3, 4, 20, 23
5.5	1, 5, 8, 19, 21, 36
5.6	7, 20, 27, 29, 30, 31, 46, 47
6.3	3, 6, 7, 8

Textbook: Edgar G. Goodaire "Linear algebra"

Problem Set	Problem Numbers
7.1	12, 13, 17
7.2	1, 4, 8
7.3	4, 5
7.5	1a, 5, 6, 7

Some more problems

- Demonstrate that if v is an eigenvector of the transformation T, with λ the corresponding eigenvalue, then v is also an eigenvector of the transformation T^2.
- Suppose that v is an eigenvector of the transformation T^2, with λ the corresponding eigenvalue. Is v also necessarily an eigenvector of the transformation T itself (with corresponding eigenvalue $\pm \sqrt{\lambda}$)?
- Find one eigenvalue and the corresponding eigenvector of the given matrix . Do you find any correlation with sum of each row and eigenvalue? Search about this interesting property.

$$A = \begin{bmatrix} -7 & 7 & -6 \\ -5 & -1 & 0 \\ 3 & -7 & -2 \end{bmatrix}.$$

Questions from older topics (elimination, orthogonality, etc)

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Problem set	Problem Numbers
1.3	22, 25, 28, 32
2.1	8, 18
2.2	12, 27, 56
2.3	15, 34, 44
2.4	13, 36, 40
3.1	9, 20, 35, 51
3.4	6, 9, 20, 32