Project Instruction

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April 18, 2021

This is the instruction for your project in this class. It counts for 10% of this class. You can do them individually, or you can do them in groups. Each group should have at most four people. (This was an arbitrary rule, my main goal is to prevent situations like if the whole class is in one group....)

There are three options, and whatever you choose is fine by me.

It shall be graded somewhat leniently, so don't stress too much. If you find yourself to have little time, choose Option ONE and just do seven problems of the Matrix Analysis book, which is probably the fastest option.

1 Option One

Do a self-study project, and do seven problems to prove it.

1. Read Chapter 2 of Matrix Analysis by Nicholas Higham and do all 7 problems of that chapter.
2. Do all 7 problems in Exercise 4.2 on page 65 and 66 of Rey Casse's book on Projective Geometry. (You do not need to read all 65 pages. However, chapter 2 (p15-p21) and the portion of chapter 4 before the problems (p45-65) are probably necessary.)
3. If you have something else to learn in mind, check with me first, and we can see if it could work out.

2 Option Two

Write an expository paper on the following subjects. You should explain the related concepts and phenomena, explore a bit, and hopefully with many specific examples and/or counter-examples in your exposition. Here are some possible topics.

1. Substitutes for "Jordan canonical form" over finite field (Stone normal form, rational canonical form or what have you.)
2. Relations between the Jordan form of AB and the Jordan form of BA for generic square matrices A, B.
3. Stress tensor, Strain tensor or Elasticity tensor field in continuum mechanics.
4. Electromagnetic tensor or Riemann curvature tensor in Physics.
5. Trifocal tensors and photography.
6. If you have something else to learn in mind, check with me first, and we can see if it could work out.

3 Option Three

Do something otherworldly and fun.

1. Orientations and solvability in the Rubik's Cube. Trust me this is related to linear algebra.
2. The board game SET. Trust me this is related to linear algebra.
3. If you have something else to learn in mind, check with me first, and we can see if it could work out.