Paper Template

Name

Abstract

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Do not make the abstract too long.

Contents

1 Introduction and Prior Experience

First introduce the topic, which could include why you choose this topic/what interested you.

Next discuss connections to other classes and any prior experience with content related to topic before the capstone, including how and in what context you covered related topics in classes and other experiences, including previous research experiences related to surfaces or connections to metric forms like the Pythagorean theorem and coordinates, as appropriate to the topic you chose. This section could include definitions and a summary of examples and important results. **This also serves an a general introduction to the topic aimed at others who may not have had the coursework you did.**

Most people will probably summarize some related content from Calculus II and calculus III and perhaps from other classes like linear algebra, physics courses, or others.

1.1 MAT 1120: Calculus With Analytic Geometry

1.2 MAT 2130: Calculus With Analytic Geometry III

1.3 MAT 2240: Introduction to Linear Algebra

$$A = \begin{pmatrix} \cos\theta & -\sin\theta & 0 \\ \sin\theta & \cos\theta & 0 \\ 0 & 0 & 1 \end{pmatrix}$$

represents a counterclockwise rotation by θ in the $x - y$ plane with the z coordinate fixed.

1.4 MAT 3610: Introduction to Geometry

2 Historical Connections and Applications

Look for historical significance and history of when the related people discovered or investigated your topic (include full names as well as dates), including at least one mathematician from a country outside of the US when possible (it could be someone who laid groundwork on the surface, or peripheral but connected work). If your surface or metric is named after someone, you should look up that person too. Overall, this should include diverse people and cultures who contributed as you look at the development of mathematical ideas from the past

Here are in text citations for the bibliography [1, 2, 3, 4, 5] which should be placed where appropriate, like [1].

This section should also highlight some historical and/or modern applications.

3 Differential Geometry of ***

This section should include differential geometry of the topic from 4140 HW 6 or HW 7 (or equivalent). Basically look at the relevant homework and type up the results that are not already in the last section. Be sure to use professional formatting.

You can wait to work on this section until you complete the relevant HW assignment in 4140. Unless you have prior experience with differential geometry, the topic you choose will connect to assignments in 4140 so that the capstone project in 4141 and work in 4040 will complement each other. Thus, much of the work for the project will be done in concert with MAT 4140 and the focus is on preparing the formal project. If you selected another topic, talk to me about what "or equivalent" might mean.

4 Conclusion

This section should conclude in some way. Try to be creative. For example, if you have ideas for what you might have liked to look at if you had more time, summarizing possible future directions can be interesting in a conclusion.

Or you might look back as you reword something like this in your own words: The overall idea is to incorporate different levels and areas as appropriate to investigate mathematical knowledge from MAT 4140 in order to recognize the development of mathematical ideas from the past and the breadth of mathematics covered in MAT 4140, its impact on mathematical study, and its relation to the global mathematical community. (Consider adding to prior or this section as needed to strengthen these connections).

5 Acknowledgements and References

Acknowledgements

I wish to acknowledge the importance of... or thank...

References

[1] Cullen, Charles. *Matrices and Linear Transformations, 2nd edition.* Reading, MA: Addison-Wesley Publishing Company, 1972

[2] Kastrup, Hans A. *On the Advancements of Conformal Transformations and their Associated Symmetries in Geometry and Theoretical Physics.* Annalen der Physik (v. 17/9-10, 2008)

[3] Kleiner, Israel. *A History of Abstract Algebra.* Boston: Birkhauser, 2007

[4] O'Connor, John and Edmund Robertson. *MacTutor History of Mathematics Archive: Search Results for Transformations.* Available online: `http://www-history.mcs.st-andrews.ac.uk/Search/historysearch.cgi?SUGGESTION=transformations&CONTEXT=1` (accessed February 2011)

[5] Rosenfeld, Boris Abramovich. *A History of Non-Euclidean Geometry: Evolution of the Concept of a Geometric Space.* New York: Springer, 1988

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