Overview

Patrick Oare

These notes are my attempt to put what I've learned of math and physics during my undergraduate and graduate degrees down onto paper. They'll be separated into Physics and Math directories. There will typically be some overlap in content between the note sets in each directory, but the physics notes will usually be written in a bit more of a free style, whereas the math notes will tend to be more precise. All notes should provide a good amount of examples that help reinforce the material, which I find to be especially helpful as the material gets more abstract.

The notes in this repository are in a variety of different stages. Notes marked "completed" have been edited and are more or less in their final form (although if you find an error, please let me know!). Notes marked "in-progress" need to be edited and will likely be missing some content. Notes marked "future" are planned for the future when I either have the time to write them, or actually get around to learning the material.

1 Physics notes

1.1 Completed notes

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1.2 In-progress notes

- The Standard Model.

- Instantons and solitons.

- Colliders.

- Hadron structure.

- Representation theory.

- The Lorentz and Poincaré groups.

1.3 Future notes

- Renormalization.

- Lattice gauge theory.

- Topology in lattice gauge theory.

2   Math notes

2.1   Completed notes

- Metric spaces.

- Measure theory. (finish a few proofs)

2.2   In-progress notes

- Probability and stochastic processes.

- Point-set topology. (finish a few proofs)

- Differential forms.

- Complex analysis.

- Set theory.

- The fundamental group.

- Topological manifolds.

- Homology.

- Algebra (groups, rings, fields, modules, polynomials).

- Galois theory.

2.3   Future notes

- Mathematical quantum mechanics.

- Differential manifolds.

- Differential geometry.

- Fiber bundles.

- Characteristic classes.

- Stochastic calculus.

- Random field theory.

- Mathematical statistics.

- Functional analysis.