Physics 50 **My View**

The Mathematical Methods in Physics course(Physics 50) was designed for **one purpose only**, namely, to **supplement** standard mathematics courses normally taken by physics majors with an **extensive discussion of the theoretical and computational methods and techniques that are needed for studying advanced physics.**

Specifically, we decided to **forego extensive proofs** in favor of presenting the details of methods and techniques, presenting lots of examples and making some connections to physics and astronomy.

Often, a procedure will be defined or a method proposed **without any justification** (and certainly without any proof). This is being done **on purpose.** We simply do not have the **time** to do both the methods **and** the proofs. Often the **only justification** required for using a particular mathematical procedure or making a particular mathematical definition in physics or astronomy is that **it works**, that is, it gives results (solutions of equations) that **agree with experiments** in the real world.

Mathematicians are able to **create**(choose the relevant axioms or postulates) their own **worlds** and then proceed to investigate their properties.

Physicists **must derive** their axioms and postulates from the **real world systems** under investigation. This can only be done via **experimentation. Based on** the axioms and postulates so derived from experimenting with the real world, we then make definitions, design methods and techniques and invent theories.

For example, when studying partial differential equations (PDEs), the **mathematician** will spend most of the time understanding **existence and uniqueness** properties of solutions. The **physicist**, on the other hand, spends **almost no time** in these areas. We **know** the solutions exist because we can set up real systems in the laboratory and experiment on them. We **know** the solutions are unique because the experimental results are reproducible.

More **important** to the physicist are the **equations** representing the system, the solution **methods**, the **exact or approximate** particular solutions we can find when applying the solution methods to the equations and the **physical properties** of the solutions.

The question "**why we make certain choices**" is really not relevant. The answer will always be simply "**that is the way the real world seems to work**".

This is the **approach** I will take in lectures and **your questions**, etc, should also **take into account** this approach to the mathematics. In this way, we will have harmonious and efficient classroom lectures and discussions.

Thanks,

John