Re: prerequisite to Differential Geometry

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- *From*: vartkar@xxxxxxxxxxxxx
- *Date*: Sat, 07 Jul 2007 09:24:36 −0400

On Sat, 07 Jul 2007 09:20:37 −0400, vartkar@xxxxxxxxxxxxx wrote:

> Stephen:
> The reason I want to learn differential geometry is that I am trying
> to pave the way to studing general relativity. So you are saying
> that if I am on sold ground with linear algebra and multivariable
> calculus, the book "Calculus on Manifolds" by Spivak should provide me
> with the rest of the preparation to differential geometry?
>
> Saghatiel
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> On Fri, 06 Jul 2007 22:54:56 −0400, "Stephen J. Herschkorn"
> <sjherschko@xxxxxxxxxxxx> wrote:
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> > vartkar@xxxxxxxxxxxxx wrote:
> >
> > > Could someone tell me what are the prerequisites to
> > > differential
> > > geometry.
> > > Is it just plain geometry and differential equations?
> >
> > It depends at what level you will be studying it, and with which
> > textbook. At the undergraduate level, you might just need a could
> > multivariable course. Linear algebra would help. Really nothing else
> > was a prerequisite for my undergraduate course, which used the text by
> > Millman and Parker, though some topology and real analysis might help.
> >
> > For a graduate level course, you certainly need topology and analysis.
> > Algebraic topology (for which you need some abstract algebra) would help.
> >
> > You do not need differential equations anywhere, really. And I agree
> > with quasi that physics might provide motivation for some of the subject.

However, I respectfully disagree with quasi when he mentions

> Differential Equations
> Abstract Algebra
> Tensor Analysis
> Complex Analysis
> Modern Geometry (especially Non−Euclidian geometry)
> Lie Groups & Lie Algebras

Differential equations don't show up much, if at all. My impression is you need only a few basic concepts from abstract algebra and complex analysis; if you haven't seen these before, you can pick them up along the way. I consider vector analysis included in multivariable calculus. You will learn what you need of the rest in the course of studying differential geometry.

Most of the calculus, analysis, topology, and linear algebra you will need for a first course is contained in Spivak's Calculus on Manifolds.

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