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From : Suvrat Raju <suvrat@physics.harvard.edu>     Tomu |  Inbox
 Reply-To : suvrat@physics.harvard.edu
 Sent : Wednesday, October 26, 2005 11:15 PM
 To : M.Atiyah@ed.ac.uk, Michael.Atiyah@ed.ac.uk
 Subject : functional differential equations (fwd)

 Attachment : em2body.pdf (0.31 MB)

MIME-Version: 1.0

Received: from us19.unix.fas.harvard.edu ([140.247.35.199]) by mc3-f23.hotmail.com with Microsoft SMTPSVC(6.0.3790.211); Wed, 26 Oct 2005 16:16:51 -0700
 Received: from ls04.fas.harvard.edu (ls04.fas.harvard.edu [140.247.34.104]) by us19.unix.fas.harvard.edu (8.12.11/8.12.11) with ESMTP id j9QNFb2v019922; Wed, 26 Oct 2005 19:15:11 -0400

Received: by ls04.fas.harvard.edu (Postfix, from userid 4132) id 09DB21C048; Wed, 26 Oct 2005 19:15:10 -0400 (EDT)

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X-X-Sender: raju@ls04.fas.harvard.edu

Return-Path: suvrat@physics.harvard.edu

X-OriginalArrivalTime: 26 Oct 2005 23:16:51.0849 (UTC) FILETIME=[58FD3F90:01C5DA83]

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Dear Professor Atiyah,

I am a graduate student at Harvard. I have been working, with Prof. Shiraz Minwalla, on aspects of the AdS/CFT correspondence.

I heard your very interesting talk at the KITP, on whether the Universe has a history, via webcast.

As was brought up in the questions after the talk, relativity necessitates the replacement of ordinary differential equations with functional differential equations. As Prof. Gross mentioned, this is currently done in modern Physics by introducing fields.

However, a comprehensive analysis of the physical and philosophical implications of replacing ordinary differential equations with functional differential equations was first done more than 10 years ago and may be found in the book "Time: Towards a Consistent Theory. By C.K. Raju. Dordrecht, Netherlands: Kluwer (1994) (Fundamental theories of physics, 65)."

Prof. Raju considers functional differential equations of both the 'retarded' and the 'mixed' type. Moreover, in Chapter VI, he shows how it is possible to reconstruct the formal structure of quantum mechanics from this.

Moreover, last year, Prof. Raju also published the first ever solution to retarded functional differential equations in the concrete physical context of a two body electrodynamic system. These results may be found in "The electrodynamic 2-body problem and the origin of quantum mechanics", Found. Phys. 34 (6) June 2004, 937--62.

I have attached a pdf vesion of the paper to this email.

Thank you.


Regards,

Suvrat Raju

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Content-Transfer-Encoding: BASE64
Content-Disposition: ATTACHMENT; FILENAME="em2body.pdf"
Content-ID: <Pine.LNX.4.58.0510261912310.21410@1s04.fas.harvard.edu>

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Return-path	<suvrat@physics.harvard.edu>
Received	from mta1 ([172.16.28.189]) by pop2.vsnl.net (vsnl mail server) with ESMTP id <0IP300K08RG0WI@pop2.vsnl.net> for c_k_raju@vsnl.net; Sat, 29 Oct 2005 09:08:24 +0530 (IST)
Received	from us20.unix.fas.harvard.edu(us20.unix.fas.harvard.edu [140.247.35.200]) by mta1.vsnl.net (vsnl mail server)with ESMTP id <0IP3004H8RFYCU@mta1.vsnl.net> for c_k_raju@vsnl.net; Sat, 29 Oct 2005 09:08:24 +0530 (IST)
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Received	by ls04.fas.harvard.edu (Postfix, from userid 4132) id B5FF31C065; Fri, 28 Oct 2005 23:38:19 -0400 (EDT)
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Date	Fri, 28 Oct 2005 23:38:19 -0400 (EDT)
From	Suvrat Raju <suvrat@physics.harvard.edu>
Subject	Re:
X-X-Sender	raju@ls04.fas.harvard.edu
To	"C. K. Raju" <c_k_raju@hotmail.com>, c_k_raju@vsnl.net
Reply-to	suvrat@physics.harvard.edu
Message-id	<Pine.LNX.4.58.0510282337190.5933@ls04.fas.harvard.edu>
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Original-recipient	rfc822;c_k_raju@vsnl.net

Here is Atiyah's reply :-) Maybe you can write to him directly.

----- Forwarded message -----
Date: Fri, 28 Oct 2005 21:40:34 +0100
From: Michael Atiyah <M.Atiyah@ed.ac.uk>
To: suvrat@physics.harvard.edu
Subject: Re: functional differential equations (fwd)

Der Mr Raju,

Thank you for drawing my attention to the paper and the book. They seem relevant to my ides and I have found them helpful.

Incidentally are you relatd to the author of the book?

Michael Atiyah.

Quoting Suvrat Raju <suvrat@physics.harvard.edu>:

> Dear Professor Atiyah,
>

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From : Michael Atiyah <M.Atiyah@ed.ac.uk>
Sent : Saturday, November 19, 2005 10:18 AM
To : "C. K. Raju" <c_k_raju@hotmail.com>
Subject : Re: functional differential equations



MIME-Version: 1.0
Received: from lawnmarket.ucs.ed.ac.uk ([129.215.166.63]) by mc5-f1.hotmail.com with Microsoft SMTPSVC(6.0.3790.211); Sat, 19 Nov 2005 02:19:15 -0800
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X-Accept-Language: en-us, en
References: <BAY104-F19650E5869D0CBDA0292E8CB620@phx.gbl>
X-Edinburgh-Scanned: at lawnmarket.ucs.ed.ac.uk with MIMEDefang 2.33, Sophie, Sophos Anti-Virus
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Return-Path: M.Atiyah@ed.ac.uk
X-OriginalArrivalTime: 19 Nov 2005 10:19:15.0878 (UTC) FILETIME=[B1C70C60:01C5ECF2]

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Content-Type: text/html; charset=us-ascii
Content-Transfer-Encoding: 7bit

Dear Professor Raju,

Thank you for your message and my apologies for this late reply.

There is certainly some overlap in our ideas about the relevance of retarded differential equations to physics, but my own ideas are still fluid and far from settled. If they converge to anything sensible I will pass them on to you.

While I was in Santa Barbara, California, my attention was drawn to Feynman's thesis (just recently published under that title by World Scientific Press - author Laurie Brown). Retarded and advanced differential equations arise there in the context of the dynamics of charged particles and you might find the discussion interesting.

Michael Atiyah



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