



Bob Eisenberg <bob.eisenberg@gmail.com>

Let's get going.....ill posedness right now

Bob Eisenberg <beisenbe@rush.edu>

Thu, Feb 24, 2011 at 2:04 AM

Reply-To: beisenbe@rush.edu

To: Xiaofan Li <lix@iit.edu>, Chun Liu <liu@math.psu.edu>, Bob Eisenberg <beisenbe@rush.edu>

Dear Xiaofan

I enjoyed my discussions immensely and look forward to immediate progress on posing the boundary value problem correctly, but in fact you and Chun may solve that tomorrow!

Remember

a) start at time zero

b) EXPERIMENTALLY we always control an electrical boundary condition on CURRENT not flux

c) if you include all fluxes of ions and current the problem is overspecified and potentially ill posed

d) the numerical values of coefficients is CRUCIAL.

Current measurements are the sum of all charges.

A tiny current can produce a huge effect on the charge density and thus the electric field.

e) Thus, how you resolve the overspecification is crucial

f) the infinite time boundary condition is NOT KNOWN and is different for different situations. Experimentally one stops the experiment if the result keeps growing.

g) the VOLUME of the baths must be EXPLICITLY included in the analysis because it is used by experimentalists to control the time scale of slow growth (see item (f) above)

h) a $d\phi/dt$ term (i.e., that arises from the dE/dt term in Maxwell's electric field equation) is ALWAYS present. Its coefficient is adjust in the lab by putting a metal plate connected to zero potential close to the set up. This is roughly equivalent to changing the dielectric coefficient which multiplies the $d\phi/dt$ term (if the potentials do not vary much with x , and they don;t on the very large scale of the size of the metal plate, which is much larger than the size of the baths which in turn are much much much larger than the size of the channel)

This should be great fun!!!!!!!!!!!!

As ever
Bob

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Bob aka RS Eisenberg

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On Tue, Feb 22, 2011 at 12:09 PM, Xiaofan Li <lix@iit.edu> wrote:

Dear Bob,

You gave a wonderful talk yesterday and it's very productive as well in terms of moving forward with our collaboration. I will try to schedule a visit to your lab.

Best,
Xiaofan

On Tue, Feb 22, 2011 at 12:02 PM, Bob Eisenberg <beisenbe@rush.edu> wrote:

> Dear Shuwang and Xiaofan

>

> I hope you had a safe trip home last night.

> I was horrified to hear this morning that

> Lake Shore Drive around 36 st had been

> closed just at the time we were driving home.

>

2/24/2011

Gmail - Let's get going.....ill posednes...

> My greatest danger was getting in and out of
> the car in the parking lots (at IIT and at home).
> The car fortunately did not slide while driving!
>
> Thanks for the fine dinner and wonderful visit.
> I look forward to lots of exciting science.
>
> As ever
> Bob
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