02 Feb. 2012

Chapt. 1 ELEC 340 TA Lab Log Progress Report

TA: Philip B. Alipour

General Log and Notes:

- Session Started at 1:30PM. The formal duration is 1:30 to 4:20PM.
- Due to Lab tutorial and introductory session for certain formalities involving students and the TA (me), another 40 minutes were added and finished at 5:00PM. Extra minutes remained for examination of the remaining B08 members.
- Total of 18 Students were present, 1 absent.
- It was attempted to make sure that the students learned the fundamentals of how to use the simulation program as a new skill, as well as their knowledge relative to it.
- The overall marks shall be finalized for 100% contributing to the report based on the current electronic files, discussions and results as well as further improvements that shall be made before the deadline.
- All relevant electronic versions with results from the lab are to be submitted before Friday, 9:00 AM Feb 8th 2013. This includes those who have missed their pre-labs, now to be attached with their reports. **Note:** It is expected that when the next session starts, all students have their next pre-labs ready on arrival.
- Those who have worked hard and productive + being creative in using **MEFiSTo** software tools interactively by receiving hints from the TA, their efforts shall be reflected in their report marks. They shall receive an *extra* 5% (assessed and assigned by the TA) out of 50% of the labwork in aim of guaranteeing 5% of the 100% *results*. **Note:** A full 100%, if gained, is converted to 5% of the total course mark.
- Further, outside of the scope of the lab manual, where students needed hints for solving a problem had constructive feedbacks and interactive discussions to clarify a concept upon design and analysis. **Note:** It was emphasized that students should finish their work in groups of two, and of course, possibly giving hints to each other for better usability of tools and not the solution per se, unless asked from the TA in person. However, the outcome was satisfactory and the overall marking was based on the efforts and progress of the students made on this lab session.
- Based on the required students' progress throughout the major sessions specified at http://www.cerl.ece.uvic.ca/poman/Courses/ELEC340/ELEC340.htm, it is mandatory to attend all labs punctually and no later. It is deemed that all pairs have an equal share of participation. Late arrivals, from now on, shall be classed with reduction of grades for that person. No attendance is deemed as 0% even when a group report is submitted on behalf of the individual.

Notes for the Attending Students on the forthcoming lab sessions:

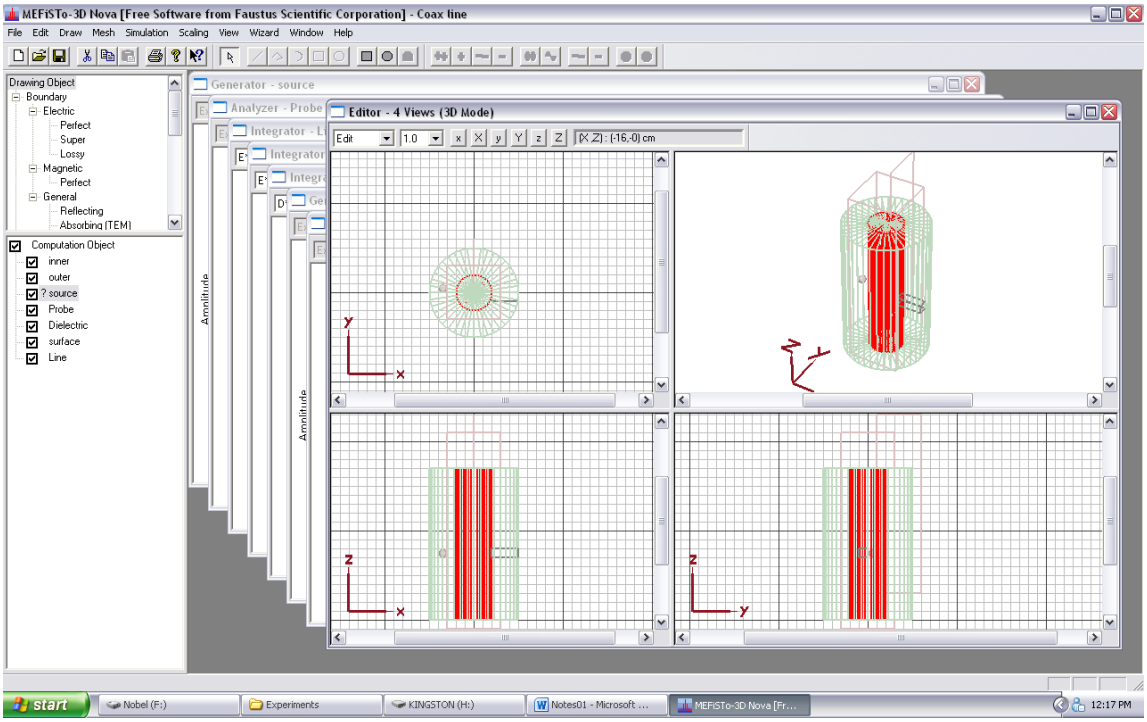
- Remember to finish off before your deadline on the session as occurred. The deadline is on Friday, 9:00 AM Feb 8th 2013. After this hour and minute, any submission is deemed as late thus receiving a penalty of 25% per day according to ELEC 340 course notes (you may download it from the main webpage). Please send your reports to philipbaback_orbsix@msn.com or phibal12@uvic.ca
- Relative to our discussions made during the session, some students in particular had problems with understanding the notion of Gaussian surfaces, E-Loops, probes and sources in design. This is how I have simplified matters as one could visualize:

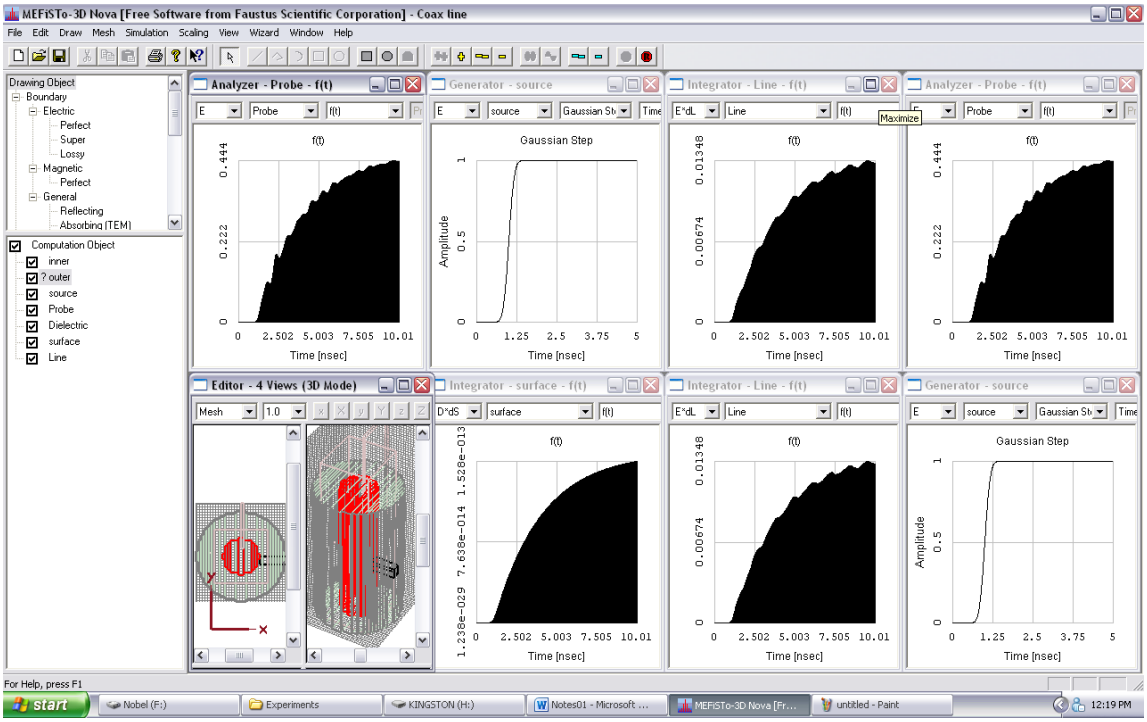
Consider two parallel metal plates that physically exist in our real world. A source touching both plate surfaces and a probe between them respectively are: giving off something, receiving something. Without conductivity, nothing is thus received. So, the concept of a dielectric becomes relevant to affect the probe even without creating a loop since there is something happening in terms of power, field and noise. This is visible during analysis where the capacitor gets loaded (charged or uphill as *C*-performance). How? Imagine a capacitor to be a bucket, capable of storing a maximum of 1 gallon water. It could also get overflowed. For example, a capacitor with a low voltage V_1 could get overflowed by high V_2 since it could only hold a limited amount of energy (low voltage). So, the source has – and + poles thus creating the device as passive. An E-loop is created to maintain a phase of sequential effects. One could deem this as a phase lock or loop to sometimes stop current for a while in a complex multiphase circuit (excluding the overflow problem). A good example is a diode connected to a capacitor to multiply voltage for high voltage applications. Thus, the probe is alternatively affected by this loop. Now we have a closed surface. Meaning that, in a closed circuit, we study the flow via Gaussian (G)-surfaces. For this, we need a type of measurement to produce results on the whole loop. This is defined by the G-surface. It studies the effects of the fields and their flux values inside the loop.

- So, in your experiment, what you saw on the screen as Gaussian results, are the results of the integrals i.e. **areas under curve**. That is why in this program they are all filled in black color. Of course, you may change the color to save your black ink if you need to print them out. For example, change the RGB value to silver or light gray color. So G-surfaces are merely integrators (what do we integrate? Answer, the number of charges being passed through, motion as the travelled distance with respect to time, etc. We do not integrate constants such as permittivity of a material, like Air.) In the analyzer, try to produce fine results to confirm your capacitance, thus the resistance involved during conductance (current being passed through a wire, and its product with resistance gives a potential difference *V*). All we are doing is measuring energy in its potential form, against its current form *I*. Thus, any fluctuation or leaks could be detected in some device, wire, coaxial cable, etc. for a better design.

- Make sure whether you get this integrator/animator concept right. Animation is studying/observing a selected area of events occurring with respect to time. Therefore, G-surfaces are meant to just study that, specifically field flux (usually in time-varying fields, gravitational, electrical, etc.). In the second part of the experiment, the following contains the wireframe viewpoint from my sample. Gaussian is merely relevant through the cable and where the contacts are, or even at specific points as far as the loop is contacted with the core: a combination of air as a dielectric and other materials, ensuring some field is being generated once current is involved. So the probe is there, the source is there, contacts as the E-loop and the Gaussian. The last two contribute to the animation (closed surface integrals). Simply, try to distinguish the usage of e.g., $\oint x\,dA$, from $\int x\,dt$ in practice, where x is a variable, t is time and A the area of vectors.
- Make comparisons with my screenshots here for producing a good quality report, as you confirm your program results with your theoretical calculations. **Note:** The constructed cable in terms of length is not added to your group_number. All of you have the same group number: B08. You may answer the following two questions in your report to gain bonus marks:

  1- Would changing the length of the cable produce different results in the animators, say for a duration of t seconds? Consider the contacts have been made on the ends of the cable. Explain.
  2- What is the difference between a G-Surface animator and a typical animator? Are we seeing both in the program when producing outputs? **Hint:** a typical animator deals with a regular integral.





Pay attention where the probe and source are in the first figure above.

- For your report, based on your observations, our discussions or experiment, please indicate the quality of communication, reception of concept and comprehension between your work and your TA. Was it useful enough to address issues on your mind as you encountered a problem? Would you prefer your TA to use more technical terms of communication, or is it sufficient enough to get the job done?
  - Also, make sure to have your pre-labs ready before the next major session starts i.e. Fri. 15, Feb.
  - Next major session will be finished according to the allocated timeslot and marking the session will be in an orderly fashion from computer station allocated to subgroup # 1 onwards.
- Those of you who want to swap with some other group member for some reason, you must inform me before the next session starts, so I'll inform other TA's and the course instructor to make a replacement, if possible (another group member).

Have a productive week ahead,

With best regards,

Philip B. Alipour,
Ph.D. Fellow Researcher in Electrical Engineering,
Dept. of Electrical and Computer Engineering, University of Victoria, V8W 3P6, Canada,
Office: ELW Room # A358,
Homepage: http://web.uvic.ca/~phibal12/