Report-Fall 2009

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I joined the Dr Martin's research group this Fall 2009 in an exploratory level. As the first assignment I was given to write a math autobiography using LaTeX at the beginning of the quarter. This let me help recall what fields of mathematics I have been very much interested and the path I have taken over the last few years to learn mathematics. Also it made me understand at this point of time which fields of mathematics I am still interested in and which fields I have added over recently that I would like to learn and apply myself in.

During the quarter, the research group presented the paper,"Capturing the inter-electron cusp in the multi-particle Schrödinger equation". As much as I tried to understand the presentations I also learnt how a big problem was broken down into sub problems in order for easier analysis and in order to find easier methods of solving. Analysis of different cases of the problem made me understand more about the problem and also made me understand a technique of analyzing a problem with its sub problems.

I also very briefly worked on Python in determining the determinant of a matrix which results in a number. Since I have not worked in Python before, in the process of learning I got help on the software from Son. When the quarter was finishing we were starting to work on finding a determinant which the elements of the matrix are alpha values. Though we could not complete it this quarter, since we found it very difficult, it helped to get use to working on Python in a very basic level.

Also through out the quarter I read the paper "Approximating a wave function as an unconstrained sum of Slater determinants" by Gregory Beylkin, Martin J. Mohlenkamp, and Fernando Pérez. I found it very hard to understand the paper and up to now have not understand it fully, but I do believe I have at least a very basic idea on the various computation techniques the paper discuss.

I was also fortunate to have a glimpse of an application of multiple regression analysis. The introduction and an abstract of the thesis of Ryan Botts were presented in one of the group meetings and we were also able to read through the introduction. This made me give more appreciation for the practical application of the multiple regressions.Also we went through a training on "' Introduction to Responsible Conduct of Research (RCR) for Graduate Students"' which exphasised on protection of data, collection of data, sharing data and specially on plagiarism etc.

Since I have never been in a research group before, working this fall quarter in the research group on an exploratory level has been a different experience and also let me learn and appreciate the fact how a research group needs to first understand the problem in hand and then go to the phase of how different techniques can be applied and advance in order to find and efficient and effective way to solve problems. Also

we were asked to critique on other work, which I think was also a part of the learning process of reading or listening or viewing with much more attention and understanding it properly. I believe that I have developed some valuable skills and I am very happy I was able to be in the research group this quarter. Thank you!