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Week 1: March 28 to April 4

Getting Started with Research and Training

The first week of the quarter has been interesting. After a break of one quarter I started working for Dr.Martin again. I have been assigned two duties. One is training the exploratory members on LaTeX and other is reading the research papers.

Two students were assaigned to me for training. I taught them the basics of LaTeX. How to run a LaTeXprogram?, how does it work?, what are the basic functions or counters neccesary to build our text document? I also taught them how various mathematical functions can be written in LaTeXand how to format the document. I feel training them will help me improve my teaching ability.

The second thing I did was going through the paper. Initially it was very difficult to understand what he was trying to tell. But later on after reading it again and clarifying the doubts with Dr. Martin I was able to understand quite a bit.

Week 2: April 4 to 11

Understanding the paper

This week the main focus was on understanding the paper. We had almost all the doubts cleared in the first paper. I read it twice and then came to the second paper which was quite easy compared to the first one. Now we were told what we are supposed to do and assigned a task.

Week 3: April 11 to 18

Adding a new row and column to the matrix

We started working on the paper with a small change done to the matrix. We added another row and column to the previous matrix resulting in a 5 by 5 matrix. Initially I could not understand how do we have to form the new matrix and how to determine the coefficients. I was also confused on how did he solve the determinant as I was getting a different answer when I solved. We approached Dr. Martin with all these doubts and clarified them all. Now we became more comfortable on solving the determinant. Finally we could solve the problem and Dr. Martin made few more changes to the solution making it easier to understand.

Week 4: April 12 to 25

Dealing with more complicated matrices

We solved the first problem by increasing the rank of the matrix by one. Then we had a slightly complicated problem by adding two more rows and columns. Initially we had problems solving it but with Dr. Martin's help we could do it. As the complexity is increasing we are going more into the research. I learnt how to solve these complex matrices. Now I am assigned a task which I am still working on it. I need to understand more clearly and determine how to bring the matrices to the form required. This is a bit difficult task but not impossible. It just needs more time and work.

Week 5 : April 25 to May 2

This week we worked on solving the determinants by making two of the matrices as rank 2. This was a good task for both of us to think more in terms of rearranging the terms so as to find an easier method without solving the whole determinant. Dr. Martin tried to design a way with atoms hitting with another atom and this chain goes on and on. He had determined a particular pattern of these atoms hitting one another. This concept has to be extended with multiple atoms hitting in different directions. We feel that the same pattern would continue further.

Week 6 : May 2 to May 9

I solved the determinant by making two of the matrices as rank 2. I also drew a diagram which shows how the atoms are moving and hitting eachother. This way we wanted to extend this concept by making all the matrices as rank 2. By solving this determinant we found it a challenging task as we felt that the atoms were again going back and forth and also making loops. We are still working on it to find what are the different patterns that can be formed.

Week 7 : May 9 to May 16

Thinking of a new approach to solve the determinants

I prepared for the presentation which I gave on introducing and solving the very simple case with all the matrices as rank 1. The work has been slowed down due to complexity. We were stuck on how to go ahead on solving the 8 by 8 matrix by making all the four rank 1 matrices to rank 2. Dr. Martin has come up with a new approach on solving these determinants. We need to check if it is the right method and how efficient is it for solving these types of determinants.

Week 8 : May 16 to May 23

Understanding the new approach

There was not much work this week as we were just trying to understand the new approach designed by Dr. Martin to solve the determinants. We felt that this approach is better than the previous one. Dr. Martin has modified his research paper with this new design. This design makes use of tensors which is a new concept for me. As this was different from what we were doing till now it took some time to understand the approach.

Week 9 : May 23 to May 30

Final Presentation

This week we haven't done any new research. We understood the new appraoch so that we could explain it to other members of the research team and prepared for the presentation. We had to explain only the new approach as the presentation was for 15 minutes and there was not much time left to explain what we did from the beginning. As these were already explained in the previous meetings we did not concentrate on them.

Week 10 : May 30 to June 6

Final Report

We didn't prepare any slides for the presentation. As we used board to write all the equations on it Dr. Martin said it would have been better if we used slides for the equations without wasting time on writing them on the board.

We were supposed to write a small report on whatever we have done this quarter. The first method we followed then tried with the new approach. What are the difficulties we faced while working with the previous appraoch. This is all we did this quarter.