ROOTS OF NON-COMMUTATIVE POLYNOMIALS

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SIGNATURE OF THE STUDENT: SIGNATURE OF THE SUPERVISOR:

Introduction

The purpose of this summer research is to find the roots of non-commutative polynomials and we did this under two cases——diagonalizable case and non-diagonalizable case. According to our free time, the supervisor Daniele arranged two-hour meetings on July 10th, 13th, 28th, 30th, 31st, and August 3rd, 4th and 5th, so we could discuss our ideas with each other. In order to do well in the research, we first read a basic material *Essay of R.Wilson* and based on this material, we wrote our own tasks which were given by Daniele. At the end of the research we were given another article *Fuchs and Schwarz - A Matrix Vieta Theorem (1995)* to do further learning and we also looked at a material called *Introduction to LaTex* to help us write our results.

Summary

Keru Zeng's task is to prove the existence of infinite many solutions to the equation $p(x){=}a_0{+}a_1x{+}\ldots{+}a_nx^n{=}0_{2*2}$ in the complex area. This question can be transformed into $\deg(p(x)){>}{=}2$ if and only if there are infinite many solutions to p(x). She gave a presentation about this question. Sufficient and necessary conditions are used to prove the problem. Then, she answered some questions from her teammates based on her presentation. Finally, she wrote down a document about the proof of this question.

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