Project 1. Available

Project dates: November 1th to June 30th

Project Title: Group Testing and It’s Application to Information Networks and Data Storage.

Adviser: Vyacheslav Rykov

Abstract:
Research will be carried out into the Boolean model of group testing that is used for the analysis of optimal procedures that search for defective units (defects) in a large population and optimal non-adaptive methods for the search of mutually eclipsing defects. The theory of static design screen experiments can be applied to multiple-access information transmission networks, to neural networks, and big data storage systems. The problem to find the information capacity of multiple-access and to neural networks will be considered.

In this project we propose that the participating student engages in the following activities:

A. Study the theoretical aspects of the problem by using following sources:

This will help her/him understand the research topic and serve as an introduction to the final, written, research report.

**B. Develop new algorithms for group testing.**

**C. Write computer programs for design screen experiments and modeling multiple access information transmission systems.**

**D. Run the programs and help the adviser in analyses of generated designs and information transmission systems.**

**E. Put together her/his findings, written software, significant graphs, tables, and so on in the final research report to be presented at the MAM Symposium.**

**OTHER REQUIREMENTS:** The students interested in the project above are expected to have taken and passed with maximal grades or close MATH 1950 (Calc I), MATH 1960 (Calc II), and MATH 4050 (Linear Algebra). They should be familiar with computers and MAPLE. The student is also expected to meet with the adviser a couple of times a week, (or communicate actively by e-mail) for discussions, guidance, and progress reports during the preparation period of the project.