Graph Theory: An Excellent Research Topic for Mathematics Students

Anthony Delgado
Columbia University, NY, USA
anthony.delgado12@gmail.com

It is not easy to find mathematics research topics for undergraduate and high school students. Many open questions entail complicated, advanced material and require years of mathematics to understand.

By contrast, graph theory is relatively new and involves readily understood basics such as trees, cycles, domination, vertex labeling, spanning trees, and hypercubes. Graph theory is applicable to a wide range of practical problems and interacts nicely with computer science.

I interviewed a Professor Emeritus of Mathematics, to understand more about the mentoring of graph theory research, including his role in mentoring five Intel Science Research semifinalists. He noted that the students enjoyed the research and worked hard to investigate the problems he provided. Many of the students eventually obtained Masters or PhDs and pursued careers in mathematics.

In a questionnaire sent to eleven students, it was found that the students were able to begin research within four to six weeks after they started to learn graph theory. All respondents rated their projects as enjoyable and interesting. The majority of respondents indicated an increase in their motivation to work hard in their mathematics and computer science courses.

Several of their research topics will be presented.

References