

## **F25.039 The Squared Digraph Conjecture**

### **Overview**

Take any digraph (i.e., a directed graph). Compute the out degree of each vertex. Given any pair of directed edges of the form  $(u, v)$  and  $(v, w)$ , add the new edge  $(u, w)$  to the digraph. Did any vertex out degree exactly double? The Squared Digraph Conjecture claims that the answer to this question is yes for every digraph. The student will work on this conjecture, attempting to verify the conjecture for specific families of digraphs.

### **What the student will DO and LEARN**

The student will meet with the faculty mentor thrice weekly. They will learn a great deal about graph theory and linear algebra. They will also become familiar with LaTeX, the programming language used in mathematics papers, as they type up results and create slides for presentations. In the spring of 2025, the intern will give at least one department seminar, will participate in UGRADS, and will attend SUnMaRC (Southwest Undergraduate Mathematics Research Conference) in Tucson, AZ. It is also anticipated that the intern will submit at least one paper for publication.

### **Additional benefits**

The combination of participating in undergraduate research, preparing and giving talks, traveling to conferences, etc. is very empowering for the students, and the overall experience serves to encourage the I2S participants to pursue careers in STEM.

### **Additional qualifications**

Having completed both MAT 316 and MAT 320 with passing grades

### **Time commitment**

3 hrs/week for 30 weeks