THURSDAY, APRIL 30
Lockett 235

3:15 – 3:35

Nowhere-Zero Flows in Graphs

Jesse Taylor

A nowhere-zero flow in a graph is an idea with which we are all familiar, whether we know it or not. Consider an electrical circuit with light switches or a system of sewer pipes. There is an exact flow in and flow out at every junction which characterizes a flow. In this talk we will discuss the conditions necessary for a nowhere-zero flow to exist in a graph and the process of determining the least possible flow number for a given graph. In 1954, W.T. Tutte conjectured that there is some fixed integer, α, such that every bridgeless graph has a nowhere-zero α-flow, and furthermore the least such fixed integer is 5. The progress made on these conjectures will be the focus of this talk.

3:35 – 3:55

Asymptotic Power Series in a Complex Variable

Mustafa Hajij

In engineering and physics we attempt to write the solutions of problems as infinite series of functions. Having a solution with a divergent series, we still want to make sense of the result and be able to interpret the solution. asymptotic series provide a powerful and intuitive way to deal these types of problemes and give most of the time a sufficient and an efficient approximation for of the probelm. In this talk we briefly introduce the concept of asymptotic series in general and then we introduce asymptotic power series in a complex variable. We consider the existence problem, namely, given a sequence of complex numbers $\{a_n\}_{\infty}^{n=0}$. Then there is an analytic function $f(z)$ in a certain domain of the complex plane with asymptotic expansion $f(z) \sim \sum_{j=1}^{\infty} a_n z^n$, as $z \longrightarrow z_0$.

3:55 – 4:15

Simplicial Homology and the Euler Characteristic

Derek Van Farowe

The classification of compact 2-manifolds is a concept familiar to most mathematicians from undergraduate topology.The classification theorem relies heavily on Euler characteristic, which can be obtained by covering the manifold with regular polygons and adding the number of verticies to the number of faces and subtracting the number of edges. My talk will focus on using homology theory to prove the invariance of this integer, and to extend it beyond 2-manifolds. Additionally I will demonstrate how an interesting result in graph theory arises naturally in the case of 2-manifolds.

4:15 – 4:35

List-Coloring Graphs

Tyler Moss

Given a graph G, we assign a size k list of colors to each vertex of G. If we can always color each vertex of G with an element from its list such that no adjacent vertices are given the same color, then G is said to be k-list-colorable, or k-choosable. The smallest k such that G is k-list-colorable is said to be the list chromatic number of G. This talk will relate list chromatic number with the more familiar chromatic number through direct comparison and analogs of coloring theorems.