Program of Talks

3:00 – 3:05: *Opening Remarks.*

3:05 – 3:20: Ryan Causey, *On the structure of A_k and $A_k(1)$.*

Abstract: In this paper, we will examine the structure of the group A_k of arithmetical functions into a ring k. We pay special attention to $A_k(1)$, the subgroup of unity functions of A_k. In particular, we will attempt to determine what properties of k guarantee or preclude the existence of torsion elements in A_k.

3:25 – 3:40: Joshua Knox and Natalie Walters, *Random trees.*

Abstract: We have taken into consideration different methods for constructing trees at random. We start with looking at the proportion of the independence number to the total number of vertices for the Galton-Watson Branching Process. Upon further exploration of the random processes we look at other methods of constructing trees and evaluating the expected number of leaves for the new methods.

3:45 – 4:00: Emily Ward, *Pillow talk: finite hyperbolic tilings and independence number.*

Abstract: This presentation explores the ideas behind hyperbolic tilings and some of their properties, specifically considering the finite tilings with three heptagons at a vertex. It then introduces the notion of two thick sleeves and their representation by sleeve graphs; finally proving that the independence number of the graph of the tiling can be found using a simpler formula and the sleeve graph.

4:00 – 4:15: *Break.*

4:15 – 4:30: Michael DiPasquale, *Asymptotic connectivity and hyperbolic planar graphs.*

Abstract: We begin with a brief overview of the basics behind asymptotic connectivity and the results already obtained for infinite Euclidean graphs with polynomial growth. Then we turn to the hyperbolic case with exponential growth and note the important nuances which were not present in the Euclidean case, particularly the importance of the boundary in metric balls about a basepoint. We present the conjecture that the connectivity of hyperbolic graphs is less than two and verify it for a particular class of quadrilateral tilings of the hyperbolic plane. In concluding, we note directions further research can take, including the need to prove independence of basepoint and the suggestion of using combinatorial curvature in estimating asymptotic connectivity.

4:35 – 4:50: Voula Collins and Elizabeth Heron, *Ordering* BS$(1,3)$ *using the Magnus transformation.*

Abstract: We apply a transformation accredited to Magnus to order the group given by the presentation $\langle a, b | ab = ba^3 \rangle$.

4:55 – 5:10: Thomas Teräväinen, *Attempted and successful orderings of the braid and Baumslag-Solitar groups.*

Abstract: In order to create an ordering, we can inject a copy of a group into a monoid algebra over some field or ring. This will allow us to use coefficients of the elements of the image of the group (and their ordering) to create a group ordering. We have seen, though, that in very many instances this does not work. I will be showing exactly why this doesn't work for the braid group on three strings and introduce a method that should allow us to order not only the Baumslag-Solitar groups, but perhaps all groups with "similar" relations.