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Discrete Mathematics Seminar

Time: Friday, October 25, 2019, 2:15-3:15 PM
Room: 330 Derrick Hall
Title: A Bijection between (n, k)-binary necklaces and the out-of-debt chip firing states on C_n
Speaker: Jina Park, Department of Mathematics, Texas State University

Abstract:

A q-ary necklaces of length n is an equivalence class of words of length n over an alphabet of size q under rotation. The number of q-ary necklaces and the number of binary necklaces were already found by C. Moreau (1872) and Stanley (1986) respectively. A recent study (Swee Hong Chan, 2010) shows that there is a bijection between q-ary necklaces of length n and multisets with divisible subset sum (mod n) when q is prime and n and q are coprime.

We code binary necklaces of length n with numbers of white beads placed between n black beads. Once k is given as the number of white, only the necklaces of length n with k white beads are considered. The set of these necklaces is $N_{n,k}$. Then, $N_{n,k}$-binary necklaces are different from q-ary necklaces or binary necklaces. We find that there is a bijection between $N_{n,k}$-binary necklaces and out-of-debt chip firing states on the cyclic graph C_n when n is an odd prime.

This is joint work with Dr. Suho Oh.