



Department of Mathematics and Statistics

COLLOQUIUM

Tuesday, December 8th, 2015

4:00 – 5:00 pm, Adel Mathematics Bldg., Room 164
(refreshments at 3:45)

Thomas Holtzworth

NAU Department of Mathematics and Statistics

M.S. Thesis Presentation

Highest Weight Classification of the Irreducible Representations of $SU(n)$

Abstract: All the irreducible representations of $SU(n)$ determine and are determined by the finite dimensional complex analytic representations of $SL(N, \mathbb{C})$. Furthermore all such representations of $SL(n, \mathbb{C})$ are uniquely identified by their highest weights, which are particular analytic homomorphisms that appear as a consequence of the representations. Additionally, the highest weights are in a one to one correspondence with integer partitions of length less than or equal to $n-1$. Remarkably, there is a deeper connection present than just the resulting one to one correspondence between the finite dimensional complex analytic representations of $SL(N, \mathbb{C})$ and the integer partitions of their highest weights. Just as the symmetric and antisymmetric subspaces of the tensor powers of n -dimensional complex space are the images of projection operators, realizations of the irreducible representation are constructed as the images of specific projection operators built from the integer partitions of the associated highest weights. In my talk, I will provide a thorough explanation of this characterization, and illustrate examples such as the classification for the case of $SU(2)$.

Algebra Combinatorics Geometry and Topology (ACGT) Seminar meets every Tuesday, 12:45 – 1:45 pm, AMB 164.

Applied Math Seminar (AMS) meets this Thursday December 10th, 12:45 – 1:45 pm, AMB 164. Wilson Lough continues his lecture over his understandings in symmetry and physics resulting from his independent study with Dr. Gary Bowman.

Friday Afternoon Undergraduate Mathematics Seminar (FAMUS) meets Fridays, 3pm, AMB 164.