

# Algebra, Combinatorics & Mathematical Physics Seminar

## *Introduction to symmetric polynomials II*

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### Abstract

The theory of symmetric polynomials is one of the most classical parts of algebra, going back to 16th centuries. Symmetric polynomials have played a key role in many areas of mathematics including the theory of polynomial equations, representation theory of finite group, Lie algebras, algebraic geometry, the theory of special functions and mathematical physics such as conformal field theory, quantum mechanics and solitons.

We will start with some examples of symmetric polynomials, and then focus on the Schur polynomials, Jack polynomials and Macdonald polynomials. We will see how to use Young tableaux in the study of symmetric polynomials.

These symmetric polynomials have important applications in physics. The most important application is quantum mechanics. Using symmetric polynomials, we can compute eigenstates (excited states) explicitly. We will see how symmetric polynomials play an important role in quantum mechanics using examples such as a harmonic oscillator and the Calogero-Sutherland model which is one of famous quantum integrable systems.

No previous knowledge about symmetric polynomials and quantum mechanics.

Date: **Friday, April 24, 2009**

Time: 3:00pm–4:30pm

Place: MAGC 1.324

For further information or for special accommodations, please contact Dr. Elena Poletaeva (elenap@utpa.edu) or Dr. Kenichi Maruno (kmaruno@utpa.edu) or Dr. Virgil Pierce (piercev@utpa.edu) .