1067-47-636 **J William Helton*** (`helton@ucsd.edu`), Math Dept., UC San Diego, La Jolla, CA 92093.
Non-commutative Inequalities.

The talk concerns inequalities for non-commutative functions. At this point we have for free *-algebras:

A. versions of the classical real algebraic geometry description of when one polynomial p is positive on the domain where another polynomial q is positive (due to a growing list of authors).

B. classification of convex non-commutative polynomials, rational functions and varieties. There are shockingly few. (due to Dym Hay Helton McCullough Vinnikov; algorithms for symbolic computation Camino, Helton, de Oliveira Shopple, Slinglend).

C. some theory of changes of variables to achieve non-commutative convexity (due to Helton Klep McCullough Popescu).

D. other.

The talk will select a topic from this. The work originates in trying to develop some theory for studying the matrix inequalities which are ubiquitous in linear engineering systems and control. (Received September 12, 2010)