

1078-05-92

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Littlewood-Richardson coefficients and tight fusion frames.

A tight fusion frame is a sequence of orthogonal projection matrices which sum to a scalar multiple of the identity. To any such sequence, we can associate a weakly decreasing sequence of positive integers given by the ranks of these projections. The question we address is the following: For which sequences of positive integers do tight fusion frames exist?

In this talk, I will discuss joint work with K. Luoto and M. Bownik where we explore this problem. In particular, we give a combinatorial characterization in terms of nonvanishing Littlewood-Richardson coefficients. This connection between algebraic combinatorics and frame theory yields several interesting results in both fields of mathematics. (Received November 23, 2011)