1083-41-87 **Jan Minac** (minac@uwo.ca), Department of Mathematics, The University of Western Ontario, London, Ontario N6A 5B7, Canada, and **Stefan O Tohaneanu*** (stohanea@uwo.ca), Department of Mathematics, The University of Western Ontario, London, Ontario N6A 5B7, Canada. *From Splines Approximation to Roth's Equation and Schur Functors.*

Alfeld and Schumaker provide a formula for the dimension of the space of piecewise polynomial functions, called splines, of degree d and smoothness r on a generic triangulation of a topological disk, for $d \geq 3r+1$. Schenck and Stiller conjectured that this formula actually holds for all $d \geq 2r+1$. Up to this moment there was not known a single example where one could show that the bound $d \geq 2r+1$ is sharp. However, in 2005, a possible such example was constructed to show that this bound is the best possible (i.e., the Alfeld-Schumaker formula does not hold if $d = 2r$, for any r), except that the proof that this formula actually works if $d \geq 2r+1$ has been a challenge up to this time when we finally show to be true. The interesting subtle connections with representation theory, matrix theory and commutative and homological algebra seem to explain why this example presented such a challenge. One needs to mention that this conjecture in fact generalizes the famous $3-1$ conjecture, which says that the formula of Alfeld and Schumaker is true for any triangulation of a planar topological disk, where $d = 3$ and $r = 1$. (Received August 21, 2012)