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Igor Klep* (igor.klep@auckland.ac.nz), **Špela Špenko** and **Jurij Volčič**. *Positive trace polynomials and the Procesi-Schacher conjecture.*

Positivstellensatz is a fundamental result in real algebraic geometry providing algebraic certificates for positivity of polynomials on semialgebraic sets. In this talk Positivstellensätze for trace polynomials positive on semialgebraic sets of $n \times n$ matrices are provided. A Krivine-Stengle-type Positivstellensatz is proved characterizing trace polynomials nonnegative on a general semialgebraic set K using weighted sums of hermitian squares with denominators. The weights in these certificates are obtained from generators of K and traces of hermitian squares. For compact semialgebraic sets K Schmüdgen- and Putinar-type Positivstellensätze are obtained: every trace polynomial positive on K has a sum of hermitian squares decomposition with weights and without denominators. The methods employed are inspired by invariant theory, classical real algebraic geometry and functional analysis. (Received September 26, 2017)