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**Maria L Macaulay**, Raleigh, NC , and **Dávid Papp\*** (dpapp@ncsu.edu), Raleigh, NC. *Rational Sum-of-squares Decompositions and Dual Certificates.*

We revisit the problem of computing rational certificates for lower bounds of polynomials. Polynomial and sum-of-squares (SOS) optimization problems are typically solved numerically using conic optimization algorithms. Turning high-precision numerical solutions to semidefinite programming formulations of SOS optimization into exact (verifiable in rational arithmetic) certificates is a challenging problem that has been studied by Peyrl and Parrilo, Kaltofen et al., and others. We present a new, dual approach to rounding numerical certificates to exact ones that avoids the explicit numerical solution of semidefinite programs and does not require high-precision numerical solutions of the SOS problem. (Received September 14, 2020)