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**" Detecting optimality and extracting minimizers in polynomial optimization  
based on the Lasserre relaxation "**

**Abstract:**

A basic closed semialgebraic subset of  $\mathbb{R}^n$  is defined by polynomial inequalities. We consider Lasserre's hierarchy of relaxations, based on moments, for minimizing a polynomial over such a set. These relaxations are semidefinite programs whose optimal values give an increasing sequence of lower bounds of the infimum. We provide a new certificate for the optimal value of a Lasserre's relaxation to be the optimal value of the polynomial optimization problem. Namely, we have to check whether a given matrix is of generalized Hankel form. This condition is equivalent to the commutativity of the truncated GNS multiplication operators. In this case we construct a Gaussian quadrature rule for this optimal solution.