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**Gregory C Verchota\*** ([gverchot@syr.edu](mailto:gverchot@syr.edu)), Department of Mathematics, 215 Carnegie Building, Syracuse University, Syracuse, NY. *Existence of positive definite noncoercive sums of squares of real polynomials.*

Suppose  $L$ , a real homogeneous positive definite (elliptic) polynomial in  $n$  variables, is a sum of squares of polynomials  $P_1, \dots, P_r$ . If these polynomials share a common nontrivial complex root, then a classical theorem of Aronszajn and Smith says that the natural integro-differential form obtained from the  $P_1, \dots$  will not be coercive for the Neumann problem associated to the constant coefficient elliptic partial differential operator with symbol  $L$ . Conversely, if no such common root is shared, then the quadratic form will be coercive.

So if there is such a common complex root is there possibly another sum of squares representation for  $L$  for which no nontrivial complex root is shared?

Many examples indicate that it would seem so. In this talk counterexamples are constructed. (Received August 06, 2007)