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**Paul S Pedersen\*** (pedersen@lanl.gov), Mail Stop B265, Los Alamos National Laboratory, Los Alamos, NM 87545. *An Ideal Separating Extension of Affine Space.*

In affine space, the set of solutions to a system of polynomial equations does not uniquely determine the system. Using the "inverse systems" of Macaulay, we extend affine space so that the solutions (in the extension) to a system of equations uniquely determines the system. We refer to those solutions associated with a given polynomial ideal the "algebraic nullspace" of the ideal.

A consequence of this construction is that there is a one to one order reversing correspondance between the sets of all "algebraic nullspaces" and the set of all polynomial ideals.

In particular, distinct polynomial ideals having the same radical have distinct "algebraic nullspaces" of solutions.

We construct an algebraic nullspace for a specific example. (Received July 12, 2007)