1019-46-81 **William Arveson*** (arveson@math.berkeley.edu), Department of mathematics, University of California, Berkeley, CA 94720. *Operator theory and the K-homology of algebraic varieties.*

Sets of commuting operators that satisfy a system of polynomial equations generate C^*-algebras that are typically highly noncommutative. These C^*-algebras can be viewed as nonclassical counterparts of algebraic varieties, and they contain information about algebraic sets that is not clearly visible from the classical setting.

We describe how one singles out the desirable properties of operator solutions $X_1, \ldots, X_n$ of systems of polynomial equations

$$f_k(X_1, \ldots, X_n) = 0, \qquad k = 1, ..., s,$$

and show how one goes about constructing K-homology elements of the associated variety in concrete terms. This construction leads naturally to an operator-theoretic conjecture about the "size" of the self-commutators $X_i X_j^* - X_j^* X_i$ of the coordinate operators $X_1, \ldots, X_n$ associated with quotients of Hilbert modules. We will summarize progress on the basic conjecture and discuss some of the issues that relate to it. (Received August 07, 2006)