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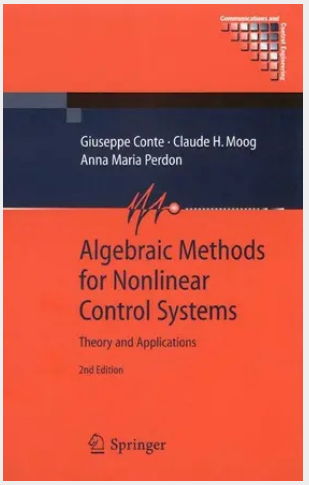
# Algebraic Methods for Nonlinear Control Systems




A self-contained introduction to algebraic control for nonlinear systems suitable for researchers and graduate students. "Algebraic Methods for Nonlinear Control Systems" develops a linear-algebraic alternative to the usual differential-geometric approach to nonlinear control, using vector spaces over suitable fields of nonlinear functions. It describes a range of results, some of which can be derived using differential geometry but many of which cannot. They include: classical and generalized realization in the nonlinear context; accessibility and observability recast for the linear-algebraic setting; discussion and solution of basic feedback problems; results for dynamic and static state and output feedback. Dynamic feedback and realization are shown to be dealt with and solved much more easily in the algebraic framework. The second edition has been completely revised with new text, examples and exercises; it is divided into two parts: necessary methodology and applications to control problems.

This volume provides a detailed introduction to algebraic control for nonlinear systems. It is divided into two parts: necessary methodology and applications to control problems. The book develops an alternative linear-algebraic strategy based on the use of vector spaces over suitable fields of nonlinear functions. This algebraic perspective is complementary to, and parallel in concept with, its more celebrated differential-geometric counterpart and deals more easily with several important characteristics of nonlinear systems. It describes a wide range of results, some of which can be derived using differential geometry but many of which cannot. They include: classical and generalized realization in the nonlinear context; accessibility and observability recast within the linear-algebraic setting; and results for dynamic and static state and output feedback. This second edition has been completely revised with new text, examples and exercises.

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