Some challenges and applications for continuation methods for solving algebraic systems

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In this contribution, we describe some recent applications where we have combined symbolic and numerical methods for applications in robotics and control theory. The main focus is on solving algebraic systems while guaranteeing the result, i.e., the real nature of the solutions and their uniqueness in a region, or on certifying real-time methods with strict constraints on their implementation, or on certifying robot movements in a given workspace. We have deployed basic continuation methods (Newton+Kantorovitch for certification) and we hope, through this talk, to motivate the community to propose more efficient or easier-to-use methods.