SUBDIVISION METHODS FOR SOLVING POLYNOMIAL EQUATIONS

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We present a new algorithm for solving a system of polynomials, in a domain of $\mathbb{R}^n$. It uses a powerful reduction strategy based on univariate root finder using Bernstein basis representation and *Descarte's rule*. We analyse the behavior of the method, from a theoretical point of view, shows that for simple roots, it has a local quadratic convergence speed and gives new bounds for the complexity of approximating real roots in a box of $\mathbb{R}^n$. The improvement of our approach, compared with classical subdivision methods, is illustrated on geometric modelling applications such as computing intersection points of implicit curves, self-intersection points of rational curves, and on classical benchmarks.