

An ODE based method for computing the Approximate Greatest Common Divisor of polynomials

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Computing the greatest common divisor of a set of polynomials is a problem which plays an important role in different fields, such as linear system, control and network theory. In practice, the polynomials are obtained through measurements and computations, so that their coefficients are inexact. This poses the problem of computing an approximate common factor. We propose an improvement and a generalization of the method recently proposed in [1], which restates the problem as a (structured) distance to singularity of the Sylvester matrix. We generalize the algorithm in order to work with more than 2 polynomials and to compute an Approximate GCD of degree $k \geq 1$; moreover we show that the algorithm becomes faster by replacing the eigenvalues by the singular values.

References

- [1] N. Guglielmi, I. Markovsky, An ODE based method for computing the distance of coprime polynomials, *SIAM J. Numer. Anal.*, 55 (2017), pp. 1456–1482.