

1 Polynomial regression in the Bernstein basis

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The problem of polynomial regression in which the usual monomial basis is replaced by the Bernstein basis is considered. The coefficient matrix A of the overdetermined system to be solved in the least-squares sense is then a rectangular Bernstein-Vandermonde matrix. In order to use the method based on the QR decomposition which was developed in the celebrated paper [1], the first stage will consist of computing the bidiagonal decomposition of the coefficient matrix A by means of an extension to the rectangular case of the algorithm presented in [3]. Starting from that bidiagonal decomposition, an algorithm for obtaining the QR decomposition of A due to Koev [2] is then applied. Finally, a triangular system is solved by using the bidiagonal decomposition of the R -factor of A . Some numerical experiments showing the behaviour of our approach are included. [1] G. Golub: Numerical methods

for solving linear least squares problems. *Numerische Mathematik* 7, 206-216 (1965). [2] P. Koev: Accurate computations with totally nonnegative matrices. *SIAM J. Matrix Anal. Appl.* 29(3), 731-751 (2007). [3] A. Marco, J.-J. Martínez: A fast and accurate algorithm for solving Bernstein-Vandermonde linear systems. *Linear Algebra Appl.* 422, 616-628 (2007)