

## Abstract

In this paper, for a polynomial with symbolic coefficients, we discuss how to solve its generalized Sturm sequence by subresultant chain aided by computer. As we known, Sturm sequence plays a very important role in real roots classification of algebraic equations. Generally, solving the Sturm sequence for a polynomial with constant coefficients by conventional Euclidean algorithm is not difficult, but for one with symbolic coefficients the case is much more complicated, and if its degree is greater than 7 it is almost impossible to solve out the Sturm sequence. In fact, computing the subresultant chain of a polynomial and its derivative is much easier than computing its Sturm sequence, and by computing subresultant chain we can avoid complicated divide operation. Therefore, as a main theorem in our paper, the sign relation of generalized Sturm sequence and subresultant chain is found and proved firstly, and an algorithm is given for computing the leading coefficients of the generalized Sturm sequence only by principal subresultant coefficients for the infinite interval case. Moreover, by the theorems and corollaries in the paper, we can clearly see the sign varying relation between Sturm sequence and subresultant chain, when the subresultant chain is defective. At last, for two examples we give out the detail solving procedures, and compared with Euclidean algorithm, many examples we tried on micro computer show that the algorithm is more efficient.