Analytic Multi-Solitonic Solutions of Variable-Coefficient Higher-Order Nonlinear Schrödinger Models by Modified Bilinear Method with Symbolic Computation

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In this paper, the physically interesting variable-coefficient higher-order nonlinear Schrödinger models in nonlinear optical fibers with varying higher-order effects such as third-order dispersion, self-steepening, delayed nonlinear response and gain or absorption are investigated. The bilinear transformation method is modified for constructing the analytic solutions of these models directly with sets of parametric conditions. With the aid of symbolic computation, the explicit analytic multi-solitonic solutions of the variable-coefficient higher-order nonlinear Schrödinger models are presented by employing the modified bilinear transformation method. The one- and two-solitonic solutions in explicit form are given in detail. Finally, solutions are illustrated and discussed through adjusting the parameters, so different dispersion management systems can be obtained.

Key words: Multi-Solitonic Solutions; Symbolic Computation; Variable-Coefficient Nonlinear Schrödinger Models; Modified Bilinear Method.