Variable stepsize second derivative general linear methods

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Implementation of second derivative general linear methods (SGLMs) using the Nordsieck technique have been already studied and an efficient MATLAB code based on an L–stable SGLM of order four has been developed in a variable stepsize environment. This talk is about variable stepsize SGLMs which provides an alternative to the Nordsieck technique of changing the stepsize of integration. This approach is based on the derivation of the methods based directly on nonuniform grid so that the coefficients matrices of the methods depend, in general, on the ratios of the current stepsize and the past stepsizes. For such methods, it is not required to update the input vector for the new stepsize; actually, the output vector of the last step can be directly used in the next step as the input vector.

Keywords: Ordinary differential equations, General linear methods, Second derivative methods, Variable stepsize, Order conditions.