

## عنوان مقاله:

Strongly stable multi-time stepping method with the option of controlling amplitude decay in responses

## محل انتشار:

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## خلاصه مقاله:

Recently, multi-time stepping methods have become very popular among scientist due to their high stability in problems with critical conditions. One important shortcoming of these methods backs to their high amount of uncontrolled amplitude decay. This study proposes a new multi-time stepping method in which the time step is split into two sub-steps. The first sub-step is solved using the well-known Newmark method and for the second sub-step an extended version of Newmark method is applied. In fact, similarity in basic formulas of the mentioned methods makes it available to control the amount of amplitude decay in responses obtained by the proposed method; in other words, the amplitude decay in the proposed method is controlled through constant parameters of the two methods applied on each sub-step. The precision assessment of the proposed method is performed using numerical approaches and revealed the minor period elongation error of the proposed method in comparison with other existing methods. In addition to this, the unconditional stability region of constant parameters is also determined through computation of spectral radius of the proposed method. Finally, practical assessment of the proposed method is performed through several numerical examples.

## کلمات کلیدی:

time integration, multi-time stepping method, unconditional stability, period elongation

## لینک ثابت مقاله در پایگاه سیویلیکا:

<https://civilica.com/doc/893904>

