Our aim is to study a well-known structural engineering problem about anomalous elastic-plastic responses of a two-degree of freedom model of a fixed ended beam with short pulse loading. In particular the resulting elastic vibrations may be chaotic. We will tackle this problem mainly from the point of view of numerical analysis, but we provide even some new theoretical results.

This system was already extensively studied using Runge-Kutta methods with variable stepsize and many results can be found literature, but here we want to show that some other numerical methods can be more effective in order to understand the qualitative behavior of the orbits, in particular when chaotic behavior is detected. Moreover some new analytical results support our conclusions.