

About the Parametric Analysis of Some Nonlinear and Hysteretic Models on Structural Response Under Static and Dynamic Actions

Violeta Elena Chițan¹

*Structural Mechanics Department, Faculty of Civil Engineering, "Gh. Asachi" Technical University
of Iași, Romania*

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- ▶ PhD. Supervisor: LUCIAN STRAT, Faculty of Civil Engineering, "Gh. Asachi" Technical University of Iași, Romania
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Summary

This paper deals with the researchers' work in the field of building mechanics. The PhD thesis has its contribution in the study of the building behaviour under dynamic and seismic action, both in the elastic margin and in the post-elastic one, until yielding.

I also approached the problem of the quantification of the energy dissipations that take place in the time-history process, especially in case of structures under seism of different intensity and periodical harmonic actions.

I have processed and interpreted a large amount of data and information gathered after research, in order to characterize the behaviour of hysteretic type. Logically, the study was extended to the evaluation of degradation of the structural elements, using hysteretic models.



Violeta Elena Chitan

Some models of bilinear type with and without degradation were the object of some parametric analyses of the sizes that quantify the hysteretic damping, the response of the system with a degree of freedom and of the systems having more degrees of dynamic freedom.

The equivalent system with a degree of dynamic freedom influence the post-elastic behaviour of some multi-storeyed structures, with more degrees of freedom, placed under dynamic and/or seismic actions in order to obtain equivalent parameters, using the energetic equivalence.

The mechanical work in an oscillation cycle will be the same for a hysteretic behaviour characteristic to the functions effort-deformation that describe the non-linear relation corresponding to different oscillation cycles, until yielding in the time-history process in both systems. It is calculated the equivalent rigidity for a tri-linear behaviour, changeable to an elastically perfectly plastic, with the delimitation of the point of beginning of flowing on diagram.

Keywords: hysteretic model, time-history process, degrees of freedom, oscillation cycle, periodical harmonic actions

