

OTIMIZAÇÃO ROBUSTA MULTI OBJETIVO POR ANÁLISE DE INTERVALO NÃO PROBABILÍSTICA: UMA APLICAÇÃO EM DINÂMICA VERTICAL PARA CONFORTO E SEGURANÇA VEICULAR

NON-PROBABILISTIC INTERVAL ANALYSIS FOR MULTI-OBJECTIVE ROBUST DESIGN OPTIMIZATION: AN APPROACH IN VERTICAL DYNAMICS FOR VEHICLE SAFETY AND COMFORT

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Abstract. This work performs the non-probabilistic interval analysis for multi-objective robust design optimization (NPIA-MORDO) of the suspension parameters in a quarter-car vehicle model with two degrees of freedom which the multi-objective function is composed by the suspension's vertical acceleration, the tire force applied on the road profile and their tolerances respectively. The uncertainties in the system are quantified using a non-probabilistic interval analysis with the α -Cut Levels Method for zero α -level (the most uncertainty one), performed concurrently in the multi-objective optimization process. The results obtained from NPIA-MORDO assure that is possible take into account the uncertainties from the system parameters and design variables as the external optimization loop is performed, reducing the efforts in subsequent evaluations. The non-probabilistic interval analysis performed by the proposed tool is a feasible choice to evaluate the uncertainty if compared to the standard deviation, because there is no need of previous well-known based probability distribution and because it reaches the practical needs from the automotive industry, where the tolerances are preferable.