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IDENTIFICATION OF PARAMETERS FOR MATERIAL DAMAGE MODELS BY INVERSE ANALYSIS AND OPTIMIZATION, USING FINITE ELEMENT SIMULATION

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Abstract: A reliable material behaviour modelling is a key to obtain accurate results when using numerical simulation in automotive industry. To reproduce the material properties, complex constitutive models are required and consequently more parameters have to be identified. Usually, the identification of constitutive model parameters is based in several performed mechanical tests under different loading conditions, however some of the experiments are difficult to carry out and evaluate. This paper presents an alternative approach using an inverse numerical analysis to obtain and determine the parameters of constitutive models and to characterize the material fracture behaviour. The inverse analysis methodology was implemented by programming and connecting a script for the optimization algorithm with a script for the finite element model and having an iterative procedure to find the best fitting parameter values that minimize an objective function defined for this problem. The applicability of implemented inverse approach is evaluated and validated by comparing the results obtained from finite element analysis with the experimental data, from tests with different loading conditions.