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# Hybrid Artificial Neural Network Finite Element (ANN-FE) Model for Predicting the Structural Response of RC Structures

The aims of present work is to develop a radically new stable, robust and computationally efficient structural analysis procedure capable of realistically and objectively predicting the nonlinear response of reinforced concrete structures. This procedure will be suitable for both research and practical applications and will be capable of effectively solving design optimization and reliability problems which require extensive parametric studies. Unlike existing finite element packages employed in practice, the proposed structural analysis method is capable of accurately predicting brittle and flexural modes of failure of RC structures. This hybrid (i.e. artificial neural network finite element ANN-FE) tool requires significantly less computational resources compared to traditional approaches of structural analysis (usually employed for the research purposes) which are based purely on the use of the non-linear finite element method (NLFEA). The stability and robustness of the proposed hybrid ANN-FEA tool, as well as the validity and objectivity of its predictions, is confirmed through a comparative study of its predictions concerning the behaviour of RC structures under static loads with its experimentally and numerically (i.e. SAP2000 and ABAQUS) established counterparts.

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