

# ETUDE PAR RESEAUX DE NEURONESDU COMPORTEMENT MECANIQUE D'UN MATERIAU DUCTILE.-APPLICATION AU HDPE-

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**Abstract :** The mechanical properties of materials are of a considerable interest since they conditioned not only all the problems of their working implementation but also their behavior in service in extremely diversified applications. For a determined problem, the choice of a material will depend on these mechanical properties such as resistance, hardness or ductility. It is thus necessary to measure them with a certain number of experiments which one calls the mechanical tests. In this work, we want to approach an effective law of behavior by the artificial neural networks. In the first part, we establish a data base consequent relating to this subject. The parameters taken into account are the strains according to the stress for the speeds of deformation taken between  $10^{-5}$  -  $10^{-3}$  s<sup>-1</sup>, of a high-density polyethylene (HDPE), corrected by the Bridgman's method. The selected network is a single hidden-layer feedforward, recognized for its capacity to approximate any nonlinear function. First, we divide our whole of data into two subsets: the first for the training, the second for the validation. Then we involve our network so that it learns the behavior well from the HDPE, finally we validate and we test his response for new values speed of deformation.

**Keywords :** tensile test, polyethylene, Neural Network, feedforward, BRIDGMAN