1176-00-178   **Ensela Mema***, emema@kean.edu, and **Jarowslaw Knap**. *Deep Learning Algorithms in Variational Problems of Microstructures.* Preliminary report.

Microstructures have been an active area of research because they play an important role in the macroscopic behavior of a material or system. They are often spontaneously generated to optimize performance (e.g. maximum strength at a given weight, minimal permeability), material properties that can be harnessed in defense applications such as lightweight armor and personnel protection. Variational models of microstructures however often fail to attain a minimum value and the minimizing sequences for such problems develop finer and finer oscillations, making it difficult for numerical methods to approximate solutions. In this work, we discuss whether deep learning techniques in the context of deep neural networks can be used to approximate the minimizers in variational problems of microstructures. (Received January 21, 2022)