

AN IMAGE-BASED APPROACH FOR MODELING PERMEABILITY OF FIBROUS FILTERS

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ABSTRACT

Determining permeability of fibrous media is of great importance to many industries. While there are several 2-D and 3-D analytical models developed for predicting the permeability of fibrous disordered media, there are not many numerical works that compare the predictions of these *models* with that of *real* media. In this work, we present a series of numerical simulations performed on the microstructure of a real fibrous media. An efficient procedure is presented for reconstructing 3-D images from the 2-D images of the real fibrous media and processing them for the purpose of performing fluid flow simulation. Digital Volumetric Imaging (DVI) of a typical hydroentangled fibrous fabric is obtained, as an example, and its permeability is computed. These results are compared with those obtained from the analytical equations given in the literature.

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