An analysis of the tensile strength of twisted fiber structures
CARL STARKEY, CAVENDISH MCKAY, Marietta College — We are interested
in modeling the interaction between elements within a typical twisted fiber structure
such as a thread or cable using numerical analysis techniques. A twisted cable or
thread requires frictional forces between its constituent filaments to stay together
and to transmit tension along its length. Fine scaled studies of these forces and
the properties on which they depend are computationally intensive due to the large
number of filaments involved. The current study is a preliminary look at the inter-
actions between individual filaments, starting with simple tensile strength tests and
working up to sliding friction between bundled fibers. The primary research tool
utilized in this project is the LS-DYNA finite element analysis software package.

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