

FILTRATION OF RODS

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Filtration is often used in industry to separate particles from a fluid or from other particles. Because this has such a broad range of applications, it is odd that the filtration of rods has not been examined. How do rods interact when sent through a mesh? What is the probability the rods will jam in the mesh? Can filtration be used to separate two sizes of rods? By looking into the geometry of the situation, we can begin to answer these and other questions. In order to examine this situation further, a system of monodispersed rods was set up in a water-glycerol solution (used to counter the effects of gravity). The rods were kept at a low volume fraction with respect to the liquid in order to prevent them from interacting with each other. This allowed for the geometry of the situation to be isolated. Meshes of varying size were then pulled through the solution and the number of rods that were caught during each run was counted. Also recorded in each trial were the ratio of the rod length to the mesh size and the volume fraction of the rods. By comparing these values to the number of jams and repeating the experiment multiple times, a statistical view of the situation was built up and was compared to a theory being developed in parallel to this project.