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# Theoretical Analysis of the Existing Sheet Thickness in the Calendering of Pseudoplastic Material

**Authors :** Muhammad Zahid

**Abstract :** The mechanical process of smoothing and compressing a molten material by passing it through a number of pairs of heated rolls in order to produce a sheet of desired thickness is called calendering. The rolls that are in combination are called calenders, a term derived from kylindros the Greek word for the cylinder. It infects the finishing process used on cloth, paper, textiles, leather cloth, or plastic film and so on. It is a mechanism which is used to strengthen surface properties, minimize sheet thickness, and yield special effects such as a glaze or polish. It has a wide variety of applications in industries in the manufacturing of textile fabrics, coated fabrics, and plastic sheeting to provide the desired surface finish and texture. An analysis has been presented for the calendering of Pseudoplastic material. The lubrication approximation theory (LAT) has been used to simplify the equations of motion. For the investigation of the nature of the steady solutions that exist, we make use of the combination of exact solution and numerical methods. The expressions for the velocity profile, rate of volumetric flow and pressure gradient are found in the form of exact solutions. Furthermore, the quantities of interest by engineering point of view, such as pressure distribution, roll-separating force, and power transmitted to the fluid by the rolls are also computed. Some results are shown graphically while others are given in the tabulated form. It is found that the non-Newtonian parameter and Reynolds number serve as the controlling parameters for the calendering process.

**Keywords :** calendering, exact solutions, lubrication approximation theory, numerical solutions, pseudoplastic material
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