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HYDRODYNAMIC LUBRICATION OF SYMMETRIC ROLLERS WITH TWO DIMENSIONAL CONSISTENCY VARIATION OF POWER LAW FLUIDS

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Abstract: Roller bearing is one among the varieties of rotating system incorporating the forces between a system and its environment. It also guides the movement of rotation smoothly, and hence, rolling bearings are significant machine elements pertaining to the lifetime of the system and its accuracy. Here, a thick fluid lubrication of rollers along with normal squeezing motion is considered. The consistency variation of power law lubricant on temperature and pressure is taken into account. A specific model for the lubricant consistency is considered to vary along and across the flow directions. Load, traction, temperature and pressure are calculated for various values of the consistency index n and normal velocity q. These are matched well with the previous results.

Keywords and Phrases: Hydrodynamic lubrication, non-Newtonian power law, Consistency variation, Thermal effects, Normal Squeezing, Cylindrical roller bearings.

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