

February 3, 2021

Bachelor-Thesis – numerical

Numerical investigation of surface textures in a pin-on-disc tribometer

Background

Friction reduction in lubricated bearings can significantly increase the efficiency of machines. A well-directed change of the bearing geometry through surface textures can manipulate the lubrication film, thus resulting in higher load carrying abilities or lower friction losses of the bearing. The bearing's operating conditions can be replicated experimentally with tribometers. The numerical investigation is performed by modelling the lubrication film with the Reynolds equation. The combined experimental and numerical analysis of the conditions in the lubrication gap aims at finding general statements about the potential of surface texturing in bearings.

Content of the Thesis

During this thesis, the effect of surface textures on the frictional behaviour of lubricated contacts will be investigated numerically. Firstly, it must be decided which configurations of texture shape, amount and position will be investigated. Afterwards, the conditions within the lubrication gap will be simulated with an already existing MATLAB code. Exemplary results of the conditions in the lubrication gap of a pin-on-disc tribometer are shown in the Figure below.

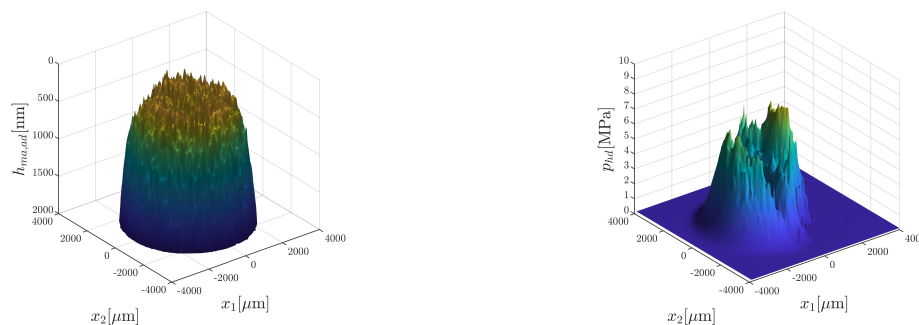


Figure: Elastically deformed pin profile and hydrodynamic pressure distribution.

Requirements:

Basic knowledge of numerical fluid mechanics and programming

Beneficial Skills:

MATLAB

Start: April 2021

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