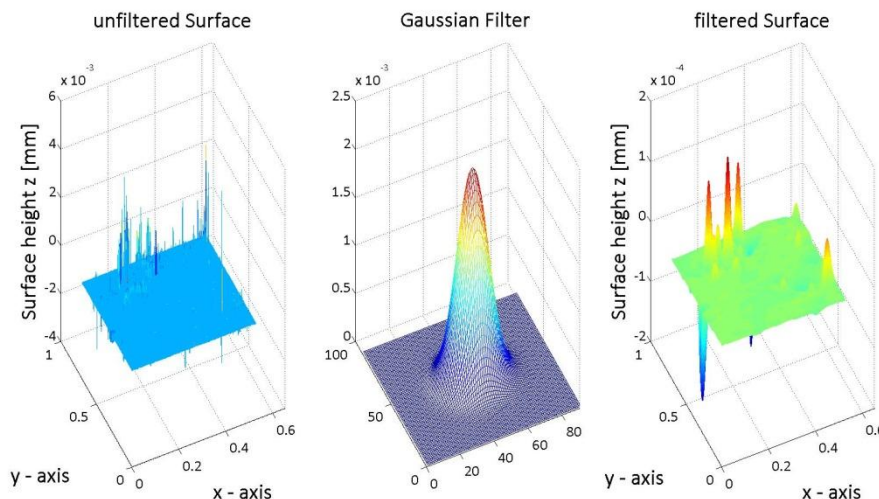


Statistical Analysis of Rough Surfaces for Contact Mechanical Calculations

When two solid bodies are pressed against each other at one or more points they will not contact within the whole nominal contact area according to the classical hertzian theory. Due to the roughness of every real surface the contact takes place only in a fraction of the nominal contact area at discrete contact spots. These spots are established by roughness asperities.



There are numerical and statistical methods to calculate and approximate the true contact area and besides that further important parameters like the contact pressure, elastic and plastic deformation of the asperities and so on. By means of measured surface data through confocal microscopy Greenwood and Williamson provide a straight forward statistical model to analyse and calculate the contact by reducing the problem to one equivalent rough surface in contact with a mathematical perfect smooth plane.

Generally only a very small area (about $1\mu\text{m}^2$) of the contact bodies is measured. So an intensive statistical analysis of a set of surface data is very important to get an idea of the statistical spread. Besides that every technical measurement is superimposed by random noise. Applying filter technics is necessary.

The task is structured into the following consecutive tasks:

- Import and convert measured data within MatLab
- Applying a Gaussian Filter and Calculate statistical surface and contact parameters by means of the existing MatLab software programs
- Documentation and presentation of the results

All the necessary data, measurement and calculation methods will be provided.

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