

Practical Work: Contact of Elastic Surfaces with FFT/BEM solver Tamaas

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1. Introduction

In this practical work, we will operate a high-performance contact solver Tamaas [1].

2. Contact of bi-sinusoidal surfaces

We will start with the contact of bi-sinusoidal surfaces, considered in [2,3], which is one of rare contact problems in 3D for which we can obtain asymptotic solution both for light contact and near the full contact. The code and comments are provided in `elastic_contact.ipynb` for Jupyter notebook and in `elastic_contact.py` for classical python. This example follows closely the Tamaas tutorial.

Your task is to obtain the evolution of the true contact area up to full contact by gradually increasing the nominal pressure and to compare results with analytical predictions which can be found in provided papers [2,3].

3. Contact of rough surfaces

A similar analysis can be carried out for rough surfaces which we generated in the previous practical work.

References

- [1] Frérot, L., Anciaux, G., Rey, V., Pham-Ba, S., Molinari, J.F., (2020). Tamaas: a library for elastic-plastic contact of periodic rough surfaces. *Journal of Open Source Software*, 5(51):2121 doi
- [2] Johnson, K. L., Greenwood, J. A., & Higginson, J. G. (1985). The contact of elastic regular wavy surfaces. *International journal of mechanical sciences*, 27(6), 383-396 doi.

- [3] Yastrebov, V. A., Anciaux, G., & Molinari, J. F. (2014). The contact of elastic regular wavy surfaces revisited. *Tribology Letters*, 56, 171-183
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