

סמינר - SEMINAR

הנדך מוזמן/ת להרצאה סמינריונית של הפקולטה להנדסת מכונות, שתתקיים ביום ב' 11.03.2019
(ד' באדר ב', תשע"ט), בניין דן קאהן, אודיטוריום 1, 14:30.

מרצה:

Prof. Michaele Ciavarella

University of Bari, Italy

על הנושא:

On application of fractals to tribology

The seminar will be given in English

להלן תקציר ההרצאה:

Fractals, some examples of which existed already well before, were popularized in the 1970's by Mandelbrot, a very peculiar man with a broad culture who applied them in many fields of physics. In tribology the application of fractal at first appears obvious, as surface roughness seems to show fractal features as noticed by Mandelbrot in 1984, for surfaces obtained by fracture. Ciavarella, Demelio, Barber and Jang in 2000 showed that the contact area, due to elastic deformations, is itself a fractal of dimension less than a surface and depends on that of the surface roughness. This means that the elastic model for the tribological problem is essentially ill-posed as it predicts in the limit that the load is shared on an infinite number of points, where the local pressure is infinite! Some truncation is required. Persson in 2001 introduced a very elegant theory which has permitted to solve the elastic contact problem in great details. The theory was originally intended for rubber friction application, where it remains hard to be applied, as the prediction is too sensitive to the arbitrary truncation. We have recently got interested in the problem of what defines stickiness between solids. Van der Waals forces are relatively large forces and one would obtain a sticky Universe if it weren't for roughness. However, are small scale details that matter, as claimed by the classical asperity model of Fuller and Tabor, or recently by Pastewka and Robbins? They both lead to paradoxical conclusion that stickiness should never exist in the fractal limit, or that it should always exist in this limit! We find these previous claims are largely incorrect, the truncation of the PSD spectrum of roughness at short wavelengths is irrelevant and find instead a simple result which clarifies a much debated question in both the scientific and technological world of adhesion, and may serve as benchmark for better comprehension of the role of roughness.

מארח: פרופ' אולג גנדלמן

בברכה,

פרופ' א"א אתי סאס

מרכז הסמינרים