# The Tomato Salad Problem

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Can we estimate the size of tomatoes when we only see the slices of the tomatoes in a salad? Translating this into rigorous mathematics, we may think of the tomatoes as spheres with random radius and the slices as sections with a mathematical plane. Hence, the more precise question is: can we determine the distribution of the sphere radii when we only can observe random planar sections of the spheres? This question is not really an issue in the kitchen, but it plays an important role in applied sciences, for instance, when biological organs with spherical cells are cut into slices in order to analyze them under the microscope.

The present talk will give an overview of results on this problem and its variants. It turns out that its solution is equivalent to solving a classical integral equation due to Niels Henrik Abel. However, we will see that there are some obstacles on the way to a solution: our intuition sometimes leads us the wrong way and the solution is numerically unstable. We will also shortly mention variants of the problem for ellipsoids and other shapes, and a version that is better suited to modern confocal microscopy – quite recently developed here at Aarhus University at the CSGB center by myself and my former PhD student Ólöf Thórisdóttir.
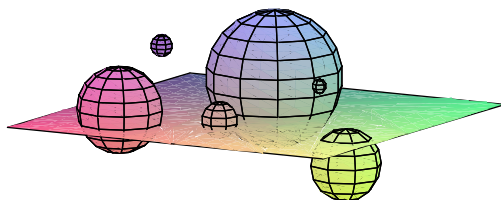
Mød op, hør foredraget og grib chancen for at blive medlem af Eulers Venner.
Vi giver kaffe, te og kage.