Explicit and implicit methods for surface reconstruction.
We have a look at several methods from the literature addressing the reconstruction of surfaces from samples of their points and their normals. The presentation starts with "explicit" methods in which the point samples are interpolated based on triangulations. In order to handle also the samples of the normals, "implicit" methods are used which reconstruct a surface using a level-set of a function. A straightforward idea is to compute the least-squares minimizer from a given finite-dimensional vector space of smooth functions, which ultimatively results in solving a linear system of equations. A bit more intricate is the following: We decompose the indicator function of the set whose surface we aim to reconstruct with respect to an orthonormal system of functions (Fourier basis, wavelet basis), and Stokes' theorem enables estimating the coefficients using our samples.