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Influence of different terrain-triangulations on a block-based landslide-model

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Influence of different surface-triangulations on a block-based landslide-model

The present work is investigating the influence of different surface-triangulation approaches on the block-based landslide-model developed by Tinti and Bertolucci (2000).
For planar (2D) surfaces as well as for objects in the 3D-space well-known algorithms like the Delaunay-triangulation are available (ensuring also special characteristics of the triangulation).
This is however not that easy in the 2.5D-case – needed for example in terrain-triangulations – where a surface is specified by points z=f(x,y). Different methods with (partly) very different results like the 2D-Delaunay triangulations (using an orthogonal projection of all points on the (x,y)-plane, implemented e.g. in CGAL), three dimensional topographic terrain representation in an integrated TIN/TEN model (Friso Penninga, 2004) or triangulations based on contour lines.
Another possibility is to create a regular planar grid (which has the advantage of being stored and accessed in a very simple and fast way) and projecting the points orthogonally on the reconstructed surface. The surface then is represented by those new points. This last method is currently used in our model and shall be compared now to other possible triangulations.
Simulations are run for simple surfaces (e.g. given by a paraboloid) as well as on more realistic, complex surfaces and evaluated with respect to the arrival times, final velocities and final positions of the sliding mass.