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3D Graphics and Modelica - an integrated approach

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Abstract

The Modelica standard library and available Modelica tools contain some facilities for specification of 3D geometry and 3D graphics. Geometry and graphics is associated with physical objects included in simulated Modelica models. However, important graphics properties are missing from this model. In particular, physical objects cannot change their shape (geometry) and rendering features (graphics) dynamically. The physics of simulation, is often not affected by geometry of physical objects. For instance, a body is often approximated by its center of mass under certain conditions. Either simple predefined shapes or specifications of geometry via external files are used. The last facility leads to separation between the model and the corresponding graphics and geometry.

Our proposal is to integrate 3D geometric and graphical features with Modelica models of physical objects. The 3D graphics information is specified explicitly via annotations containing certain graphics primitives or using instances from a specially designed geometry class library. The motivation, syntax and implementation outline for this approach are discussed in this report.

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