

# Reverse Engineering for Generation of 3D-Building-Information-Models Applying Random Variables in Computer Aided Design

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## SUMMARY

For mapping the building geometry into Building Information Models (BIM) there are usually CAD systems used. While reverse engineering is a matter of “reconstruction”, CAD is designed from a “constructive” point of view. The geometry parameters in common CAD software are modeled as constant values and assumed to be totally consistent. The absolute geometry is there described by more parameters than actually required (“over-parameterisation”). The situation for the reconstruction process is different. There, the geometrical parameters are not determined directly, but they are functions of measuring values and should themselves be expressed by random variables. This paper describes how observations can be mapped to BIM as random variables. It shows how to receive the geometrical building structure based on adjustment. The Integration of Least-Square-Estimation into Building Information Models leads to problems in data modeling because common data models need a large amount of parameters in order to describe the building structure. Standard data models like ACIS [2] or IFC (*Industry Foundation Classes*) [3] are not suitable for reverse engineering. Therefore, a new proposal will be derived.