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This paper presents computational topology techniques for Model Based Enterprise (MBE) focusing on manufacturing as reconstruction of surfaces with boundary, where all shapes of objects considered as assumed to be embedded in \mathcal{R}^3 . Model based design methodology is applied in mathematical embedded system. The idea exhibited based on the concepts that, topology allows more relaxed ideas of equivalence of shapes than geometry. The method of polygonal representation is used for identifying combinatorial views of the final shape of an object (output design) and its' base form (input material) where are in a space. While developing this model, we have seen that most of the work with surfaces thought of as objects in space can be used by treating them as certain types of "algebraic" objects. This study finds out that what are the operations can be done by using topological properties in the process of deformation between the final shape and its' base form. Internal process of the modeling system translate into precise the mathematical language. MBE aims to match the capability of manufacturing system to the outputs required for the manufacturing system by using the above techniques. Some home usage products were considered as sample models. The study is discussed and examples are shown to demonstrate the effectiveness of this approach, with specific demonstration of reconstruction improvements where refined shape optimizations have been crucial. Through these techniques, optimal way of process to the manufacturing can be identified.

Keywords: *Model Based Enterprise, Computational Topology, Surface Reconstruction, Topology Methods for Shape Understanding, Shape Optimization, Elementary Operations*