

**DRAWINGS AS MODELS FOR DESIGN:  
A Computer Drawing System to Build Models  
Supporting Design Process  
through Abstractions**

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# Abstract

A general design process can be characterized by the sequence of defining various abstract objects used to represent the artifact. For example, designers use various abstractions (defined as *abstract objects*), such as *graphs*, *polygons*, *etc.*, to represent the artifact. As design evolves, these abstract objects will be transformed into a definition (e.g. of a building) detailed enough to allow manufacturing and to determine that the result will perform as desired.

This thesis is concerned with providing a computer drawing system that could support various abstractions in the design process and allow various representations of the design to be processed and interpreted. A precise drawing contains not only the shape information, but also conveys many topological and geometric relations that its elements must hold to correspond to the artifact in reality. For many operations during design, one wants these type of relations to be maintained. Other than the drawing being an iconic model, these relations are the semantics of the drawing and, if embedded in the drawing, imbue it with many characteristics of a symbolic model. Current CAD systems have no or limited mechanisms for embedding such relations in a drawing. It is my intent to demonstrate that drawings, especially for *shape* (both *topology* and *geometry*) information, can be defined as various abstract objects during design process. Therefore, drawings are used as models to represent the artifact. When a model is manipulated, relations defined in the model are maintained.

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