

## Grammars for Machine Design

Linda C. Schmidt  
University of Maryland  
College Park, Maryland, USA

Jonathan Cagan  
Carnegie Mellon University  
Pittsburgh, Pennsylvania, USA

### ABSTRACT

The use of grammars in mechanical design research is growing in popularity, largely due to the ability of a grammar to concisely express a language of designs. It is natural to attempt to achieve the level of success at writing descriptive languages for mechanical devices as is seen with spatial grammars in describing architectural styles. However, the differences in representing form and function between the fields and the mechanical designer's focus on function must impact the type of grammars that can be used in describing mechanical designs. Two grammars for mechanical configuration design are briefly described: a string grammar for the design of cordless power drills and a graph grammar for the design of rolling carts. The ability of the grammars to generate a space of machine designs is discussed. How a mechanical design grammar can provide a platform or a designer assistance tool and the strengths and weaknesses of such a tool are presented.