Evaluating Complicatedness in Mechanical Design

Complexity and complicatedness in mechanical design have become the subjects of interest and research in the past few decades. In this research, the differences between complexity and complicatedness in mechanical systems are discussed. The use of existing models to measure complicatedness is discussed and demonstrated on sets of functionally-equivalent systems. A model for evaluating complicatedness is derived based on the existing models and our study and discussions.

We verify the consistency of the model by using it to analyze three sets of functionally-equivalent systems. We describe the design and execution of a validation experiment in which thirty experienced mechanical designers are asked to assess the complicatedness of functionally-equivalent systems evaluated using our model. The results of the experiment are analyzed both graphically and statistically for each set of systems. We then draw conclusions regarding applicability of the complicatedness model to different types of systems.