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*Topology in the Furnace: Using the Mapper Algorithm as a Data Analysis Tool to Evaluate an Electric Arc Furnace Energy Model.*

Finding areas of improvement in metallurgical processes using data analysis is often a complicated task due to the high-dimensionality and complexity of the data. In this study, we explore applications of TDA to analyze a metallurgical process. More specifically, we use the Mapper algorithm as a means to evaluate an energy model that estimates the end-point temperature of steel in an electric arc furnace. A subgroup with high model errors was identified qualitatively by analyzing the output from the Mapper algorithm, which was created by using a high-dimensional and complex data set from the furnace. It was found, through statistical analysis, that the measured energy input in the subgroup was a lot higher than the target energy calculated by the energy model. Two commonly used data analysis methods were used to compare the results from the Mapper algorithm to best practices in data analysis. The identified subgroups were not identifiable as separated subgroups using the other methods. (Received September 25, 2017)