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Dr. Andrzej Gontarz
Guest Editor for the journal Metals
Special Issue: Advances in Modeling and Simulation in Metal Forming

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Dear Dr. Gontarz

We wish to submit an original research article entitled "Application of mathematical search algorithms for unknown material properties in Additive Manufacturing simulations" for consideration to be published in the journal "Metals" in the Special issue: "Advances in Modeling and Simulation in Metal Forming".

One of the needs driving the mathematical modeling of Additive Manufacturing (AM) is the desire to reduce the cost of process and build strategy development by utilizing the virtual space. This necessitates that models be fast and accurate. This body of work aims at the latter goal of increasing model accuracy, namely for under characterized materials such as novel aluminum alloys.

The current state of the art centers around developing mathematical models and validating them using materials which are well characterized, such as Ti-64. This work goes about more efficiently developing a material properties dataset for an under characterized material by foregoing the expensive property measurement process and utilizing an optimization routine to minimize the error of the model when compared to a representative experimental case study. This new approach allows for the efficient development of datasets which produce accurate results for novel and under characterized alloys. Allowing the AM process and build strategy development to occur much sooner in the development process and facilitate faster adoption of these new materials.

We believe this work fits well into the niche created by this special issue. It applies a mathematical model to the metal AM process which is one of the newest and least understood of the metal forming processes. The work focuses an under characterized Aluminum alloy but can be applied to the AM of any under characterized or novel metal.

We confirm that neither the manuscript nor any parts of its content are currently under consideration or published in another journal. All authors have approved the manuscript and agree with its submission to metals.

Sincerely,

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