

Suggestion of PhD subject for the CSC Program 2022

“Development of probabilistic behaviors for uncertainties prediction in material forming.”

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PhD research works:

When a manufacturing process involves several variables in addition to the process parameters, there is a variance of final properties that depends on the processing conditions for each raw material to transform into an end product. For material forming process, the processing conditions also the material are a source of uncertainties that can be amplified with the process parameters range. Such variability affects the final properties of the manufactured component. The objective of this PhD study is to integrate such variability in the final mechanical properties. We aim to develop models of probabilistic behaviors whose statistical parameters are identified by an inverse method using a dual numerical/experimental approach. The experimental part will include different designs (with standard deviations on the input parameters) and mechanical tests to determine the parameters of probabilistic behavior laws. The reverse identification involves a development of algorithms capable for including uncertainties related to both material behaviors and processing conditions. Using optimization methods [1–4], we expect to obtain optimal solutions that can satisfy a target reliability level under deterministic or probabilistic constraints.

Keywords:

Mechanical behaviors, probabilistic approach, identification, inverse methods, material forming

References

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