Creation and Characterization of Statistically Equivalent RVE's for Sub-grain γ-γ' Microstructures of Nickel Based Superalloys

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Nickel based superalloys, whose strength is derived from its γ-γ' microstructure, have long been used for high temperature applications. To better understand the effect of the microstructure on the mechanical response, we have constructed a methodology to generate statistically 3D equivalent microstructures. Here we briefly review our previously described reconstruction methodology. The focus of this presentation will be on the characterization of the convergence of the microstructural based statistically equivalent microstructure (M-SERVE), as well as the Property based statistically equivalent microstructure (P-SERVE). We then present the framework for a self-consistent homogenized model as the goal of our future work.