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AUTOMATED MODELING OF SWAGED REISSNER-MINDLIN PLATES USING FEniCS

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ABSTRACT

Swaging operation of thin fuel plates is often used in high flux nuclear reactor fuels. Swage Joints involve insertion of fuel plates into grooves created along the length of the plates and then swage rolling it such that the movement of the plates is restricted resulting in a CFCF-type condition for the plates. The boundary condition developed in swage joints are different in comparison to that of a welding joint where all the six degrees of freedom get fixed. The present work deals with the automated computational model development and validation of swage joints of variable stiffness for Reissner Mindlin plates with MITC plate elements within FEniCS Environment. FEniCS is a Python/C++ based open source package with the aim of automated solution to mathematical models (partial differential equations) through finite element methods.

Keywords: Swage Joints; FEniCS; automated computational modeling; Reissner-Mindlin plate; MIT