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Conjugate heat transfer modeling and optimization of in plane cooling channels TOMAS SOLANO, KOUROSH SHOELE, JUAN ORDONEZ, Florida State University — With the current advancements in electrical engineering the heat dissipation from electronic components is increasing at a rapid pace. Efficient thermal management of these components is imperative for the systems survivability and efficiency. High fidelity CFD simulations are computationally expensive and therefore not apt for optimization schemes. Here, we formulate a rapid kernel-based model for the conjugate heat transfer of a plate heated by different heat components and cooled by forced convection. The conjugate heat transfer kernel-based model is validated with high-fidelity CFD code, and a significant reduction in computation time is observed. The model is extended to account for spatially dependent thermal conduction coefficients to account for embedded high conductivity paths as a thermal management technique. The complete model is used to optimize the design of in-plane cooling channels. The heat transfer coefficient (Nusselt number) is reported and compared for different heat source configurations.

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