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# THERMAL RECTIFICATION IN A SOLID PLATE ASSISTED BY GEOMETRY AND TEMPERATURE CYCLING

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**Abstract.** Some electronic devices must operate under extreme environmental conditions such as strong cyclic temperature variation. Under these conditions it becomes mandatory to explore technologies and strategies to protect the devices and their operating performances. In this scenario, hole-patterned materials appear as suitable platforms to improve thermal dissipation. We propose a simplified model of a conducting square plate with a hole, subjected to an oscillatory temperature gradient. We solve the heat equation by finite differences obtaining the amplitude and phase shift of temperature and heat current in the stationary regime. Given the lack of symmetry of the hole in the temperature gradient direction, we obtain a global and local rectification of the heat flux. We show that the rectification coefficient strongly depends on the frequency of the oscillating temperature, shape and size of the hole. Simulations are performed with an own code written in C++, using MATLAB for data visualization.