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A New Approach to the Optimal Design of Klystrons Using a Nelder-Mead Algorithm

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A klystron is an electron tube lined with cavities, which serves to help velocity modulate the electrons sent through the tube. It does this because the cavities emit an AC current which, depending on time, is either a positive or negative charge that speeds up and slows down the electrons as they pass by the cavities. This causes electron bunching and increases the overall velocity of the electrons. Up to this point, the design of these klystrons has been done by trial and error. A person sits at a computer, manually puts in parameters for the design, and then waits for the simulation to work. After the simulation has concluded, the person checks the results, revises the parameters, then reruns the simulation until preferred specifications have been met. In this project, we will show how to automate the procedure described above using a package in MATLAB that incorporates the Nelder-Mead Algorithm.