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Fuel Reload

      Optimization of fuel reloading is a NP problem which means it grows exponentially with the number of fuel elements in a reactor. The optimization problem consists of minimizing the amount of new fuel elements needed and maximizing the amount of time the reactor will stay critical after reloading. The authors in this paper propose an artificial ant colony network algorithm to optimize the refueling process.

      While this approach is interesting and I believe the authors do some good analysis behind their proposal, I think it could be further improved by creating a Hamiltonian and adjoint equations to optimize the amount of fuel elements and parasitism elements. While optimal control theory might not directly give the optimal geometry of the core, it can be a very useful tool to find a better optimization for fuel concentrations.