

On a mathematical model arising in the magnetic confinement of a plasma in the nuclear fusion

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ABSTRACT

I present a short survey on some mathematical results concerning to the existence of solutions and some numerical experiments on a non-local two dimensional free boundary problem modeling the magnetic confinement of a plasma in a Stellarator device. One of the main difficulties of the magnetically controlled plasma fusion (in axisymmetric geometric devices as Tokamaks or non axisymmetric geometric ones as Stellarators), is to determinate the conditions of the magnetic field and of the current density in order to maintain the plasma far from the camera walls of the nuclear reactors. I will prove the existence of a solution (Díaz, Padial, Rakotoson 1998) by means of a Galerkin argument type for a new family of elliptic problems associated to an equivalent formulation to the original problem but in a non-local form. Finally, by finite elements, I will show some numerical results (Díaz, Galán, Padial 2012).

References

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