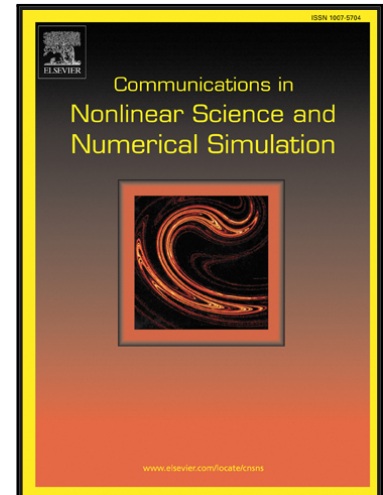


## Accepted Manuscript

Stability analysis of orbital modes for a generalized Lane-Emden equation

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**Highlights**

- We present a detailed stability analysis of a generalized Lane-Emden equation recently elaborated in the physics of trapped atomic clouds
- We use Lyapunov functions for a nonautonomous system which prove that stable spatial structures in the atomic clouds exist only for adiabatic index  $\gamma = 1 + 1/n$  with even  $n$ .
- The solutions obtained numerically are novel in literature.
- The paper has been revised.

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