

## Periodic solutions and their stability for some perturbed Hamiltonian systems

Juan L. G. Guirao\*

*Departamento de Matemática Aplicada y Estadística  
Universidad Politécnica de Cartagena  
30202 Cartagena, Región de Murcia, Spain  
juan.garcia@upct.es*

Jaume Llibre

*Departament de Matemàtiques  
Universitat Autònoma de Barcelona  
Bellaterra, 08193 Barcelona, Catalonia, Spain  
jllibre@mat.uab.cat*

Juan A. Vera

*Centro Universitario de la Defensa, Academia General del Aire  
Universidad Politécnica de Cartagena  
30720 Santiago de la Ribera, Región de Murcia, Spain  
juanantonio.vera@upct.es*

Bruce A. Wade

*Mathematics Department  
University of Louisiana at Lafayette  
P.O. Box 43568, Lafayette, LA 70504-3568, USA  
bwade@louisiana.edu*

Received 11 September 2020

Accepted 20 October 2020

Published 25 November 2020

We deal with non-autonomous Hamiltonian systems of one degree of freedom. For such differential systems, we compute analytically some of their periodic solutions, together with their type of stability. The tool for proving these results is the averaging theory of dynamical systems. We present some applications of these results.

*Keywords:* Hamiltonian system; periodic solutions; averaging theory.

Mathematics Subject Classification 2020: 34C10, 34C25

\*Corresponding author.