

A THEOREM OF GLOBAL ASYMPTOTICAL STABILITY

A. GASULL¹ AND A. GUILLAMON²

¹Departament de Matemàtiques
Universitat Autònoma de Barcelona.
Bellaterra, Catalonia, Spain.

²Departament de Matemàtica Aplicada I
Universitat Politècnica de Catalunya.
Barcelona, Catalonia, Spain.

Mailing addresses: Armengol Gasull

Departament de Matemàtiques.
Edifici Cc. Universitat Autònoma de Barcelona
08193 Bellaterra (Barcelona).
Catalonia, Spain
GASULL@MAT.UAB.ES

Antoni Guillamon
Departament de Matemàtica Aplicada I.
Av. Dr. Marañón, 44-50.
08028 Barcelona.
Catalonia, Spain.
TONI@MA1.UPC.ES

ABSTRACT: Given a vector field X on the real plane, we study the influence of the curvature of the orbits of $\dot{x} = X^\perp(x)$ in the stability of those of the system $\dot{x} = X(x)$. We pay special attention to the case in which this curvature is negative in the whole plane. Under this assumption, we classify the possible critical points and give a criterion for a point to be globally asymptotically stable. In the general case, we also provide expressions for the first three derivatives of the Poincaré map associated to a periodic orbit in terms of geometrical quantities. These results are extracted from the paper [GGG].

Partially supported by the DGICYT grant number PB93-0860.