Vol. 77, No. 2 DUKE MATHEMATICAL JOURNAL © February 1995

PSEUDOHOLOMORPHIC CURVES AND MULTIPLICITY OF HOMOCLINIC ORBITS

KAI CIELIEBAK AND ERIC SÉRÉ

1. Introduction. Let M be a compact smooth manifold of dimension n. If we equip M with a Riemannian metric, we get a 1-form θ on the tangent bundle $TM \to^{\tau} M$ which we write in geodesic normal coordinates (q_i, p_i) as

$$\theta = \sum p_i \, dq_i,$$

and $\omega := -d\theta$ is then a symplectic form on TM.

To ω and the Riemannian metric $\langle \ , \ \rangle$ we associate an almost complex structure J satisfying

$$\omega(J\cdot, \cdot) = \langle \cdot, \cdot \rangle.$$

Let $H \in C^\infty(\mathbb{R} \times TM, \mathbb{R})$, 1-periodic in time, satisfy the following assumptions.

(H1) There exists an $x_0 = (q_0, 0) \in TM$ such that

$$H(t, x_0) = 0, \quad H'(t, x_0) = 0 \qquad \text{for all } t,$$

$$H(t, q_0, p) \geqslant 0 \qquad \text{for all } t, p,$$

$$H(t, q, 0) < 0 \qquad \text{for all } q \neq q_0.$$

(H2) Let $M(t) \in \mathscr{M}_{2n}(\mathbb{R})$ be the solution of the linearized system

$$\frac{dM}{dt} = J(x_0) H''(t, x_0) M,$$

$$M(0) = I.$$

Then $M(1)$ has no eigenvalue of modulus 1.

Received 9 August 1994.
Cieliebak partially supported by Graduiertenkolleg Mathematische Physik and SFB 237, Bochum.