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COMPACTIFICATION OF MIXED MODULI SPACES IN MORSE–FLOER THEORY

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ABSTRACT. We investigate convergences in spaces which include holomorphic strips and gradient trajectories of a Morse function.

1. Introduction. Let M be a compact manifold and $f : M \to \mathbf{R}$ a Morse function. Let $P = T^*M$ be a cotangent bundle over M, $L_0 = O_M$ a zero section, $H : T^*M \to \mathbf{R}$ a compactly supported Hamiltonian and $L_1 = \phi_1^H(L_0)$ a corresponding Hamiltonian deformation of O_M. Denote by $HM_*(f)$ the Morse homology groups generated by critical points of f and by $HF_*(H)$ the Floer homology groups generated by Hamiltonian paths starting and ending at the zero section. For two Morse functions f^α and f^β, Morse homology groups $HM_*(f^\alpha)$ and $HM_*(f^\beta)$ are isomorphic, and the same is true for two different Hamiltonians H^α and H^β. We denote by

$$T^{\alpha\beta} : HM_*(f^\alpha) \longrightarrow HM_*(f^\beta), \quad S^{\alpha\beta} : HF_*(H^\alpha) \longrightarrow HF_*(H^\beta)$$

the mentioned isomorphisms. (See [**9, 10**] for more details.)

Floer [**1**] proved that Morse and Floer homology groups are isomorphic, provided that f is C^2–small enough, by choosing the Hamiltonian $H_f := f \circ \pi$, where $\pi : T^*M \to M$ is the canonical projection (actually he proved that the sets of generators are in one-to-one correspondence; the same is true for holomorphic discs and gradient trajectories which define the boundary operator on the chain complexes).

The constructions of $T^{\alpha\beta}$ and $S^{\alpha\beta}$ are based on counting the numbers of the solutions of some differential equations which are ordinary in

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