$x \in \bar{U}$ $H(x) = +\infty$, $x \notin \bar{U}$. In this way one can understand $S^{[a,b)}(U)$ for nice U in the following way. For every closed characteristic P (perhaps an iterated one) consider symbols P^-, P^+ with numerical values $A(P) := |k\int\lambda\,|\,P|$, $d\lambda = \omega$, i.e. the action (multiplicity is k) and a Conley-Zehnder index $\mu(P^-)$, $\mu(P^+)$ with $\mu(P^+) - \mu(P^-) = 1$. For $a \in (-\infty, +\infty]$ we define

$$C_k^a = \bigoplus \mathbb{Z}B$$

with $B \in \{P^+, P^- \mid P\}$ and $A(B) < a\mu(B) = k$. The limiting process defines then a boundary operator on C^a. This kind of approximation has been constructed in [10] in order to define symplectic capacities. So the symplectic homology is in some sense partially generated by closed characteristics, where each closed characteristic gives a contribution in two consecutive dimensions. This will be made more precise in [24].

Outlook. The construction we used here takes advantage of some of the special features of $\mathbb{C}^n$. Replacing $\mathbb{C}^n$ by some symplectic manifold with some assumptions on ω and c_1 one can modify the construction in several ways leading to different, however closely related theories. The techniques are comparable to those which occurred here. In [22] we will present some of the possible constructions. They will be illustrated in [25].

References

1. Amann, H.: Fixed point equations and nonlinear eigenvalue problems in ordered Banach spaces. Siam Rev., **18**, 620–709 (1976)
2. Amann, H., Zehnder, E.: Periodic solutions of asymptotically linear Hamiltonian systems. Manus Math. **32**, 149–189 (1980)
3. Arnold, V.I.: Sur une propriété topologique des applications globalement canoniques de la méchanique classique. C.R. Acad. Sci. Paris **261**, 3719–3722 (1965)
4. Arnold, V.I.: Mathematical methods of classical mechanics. Chapter Appendix 9. Berlin Heidelberg New York: Springer 1978
5. Benci, V.: Lecture MSRI, Berkeley September 1988
6. Cieliebak, K.: Pseudoholomorphic curves and periodic orbits of Hamiltonian systems on cotangent bundles. Ruhr Universität Bochum, Preprint (1992)
7. Conley, C., Zehnder, E.: The Birkhoff–Lewis fixed point theorem and a conjecture of V.I. Arnold. Invent. Math. **73**, 33–49 (1983)
8. Conley, C., Zehnder, E.: Morse type index theory for flows and periodic solutions of Hamiltonian equations. Comm. Pure Appl. Math. **37**, 207–253 (1984)
9. Ekeland, I., Hofer, H.: Convex Hamiltonian energy surfaces and their closed trajectories. Commun. Math. Phys. **113**, 419–467 (1987)
10. Ekeland, I., Hofer, H.: Symplectic topology and Hamiltonian dynamics. Math. Z. **200**, 355–378 (1990)
11. Ekeland, I., Hofer, H.: Symplectic topology and Hamiltonian dynamics II. Math. Z. **203**, 553–567 (1990)
12. Eliashberg, Y., Hofer, H.: Towards the definition of symplectic boundary. GAFA **2**, 211–220 (1992)
13. Eliashberg, Y., Hofer, H.: Unseen symplectic boundaries Preprint
14. Eliashberg, Y., Hofer, H.: An energy capacity inequality for the symplectic holonomy of hypersurfaces flat at infinity. Proc. of a workshop on symplectic geometry, Warwick 1990 (to appear)
15. Floer, A.: A relative index for the symplectic action. Comm. Pure Appl. Math. **41**, 393–407 (1988)
16. Floer, A.: Morse theory for Lagrangian intersection theory. J. Differ. Geom. **18**, 513–517

(1988)
17. Floer, A.: The unregularised gradient flow of the symplectic action. Comm. Pure Appl. Math. **41**, 775–813 (1988)
18. Floer, A.: Cuplength estimates on Lagrangian intersections. Comm. Pure Appl. Math. **42**, 335–356 (1989)
19. Floer, A.: Symplectic fixed points and holomorphic spheres. Commun. Math. Phys. **120**, 576–611 (1989)
20. Floer, A.: Witten's complex and infinite dimensional Morse theory. J. Differ. Geom. **30**, 207–221 (1989)
21. Floer, A., Hofer, H.: Coherent orientations for periodic orbit problems in symplectic geometry. Math. Z. (to appear)
22. Floer, A., Hofer, H.: Symplectic homology II: General symplectic manifolds (In preparation)
23. Floer, A., Hofer, H., Salamon, D.: A note on unique continuation in the elliptic Morse theory for the action functional. (In preparation)
24. Floer, A., Hofer, H., Wysocki, K.: Applications of symplectic homology I. (Preprint)
25. Floer, A., Hofer, H., Wyasocki, K.: Applications of symplectic homology II. (In preparation)
26. Gromov, M.: Pseuodoholomorphic curves in symplectic manifolds. Inv. Math. **82**, 307–347 (1985)
27. Gromov, M.: Soft and hard differential geometry. In: Proceedings of the ICM at Berkeley 1986. pp. 81–89 (1987)
28. Hofer, H.: Ljusternik–Schnirelmann theory for Lagrangian intersections. Ann. Inst. Henri Poincaré **5**(5), 465–499 (1988)
29. Hofer, H.: On the topological properties of symplectic maps. Proc. R. Soc. Edinburgh **115A**, 25–38 (1990)
30. Hofer, H., Viterbo, C.: The Weinstein conjecture in the presence of holomorphic spheres. Comm. Pure Appl. Math. **45**(5), 583–622 (1992)
31. Hofer, H., Zehnder, E.: Hamiltonian dynamics and symplectic invariants. (In preparation)
32. Hofer, H., Zehnder, E.: Analysis et cetera. Chapter: A new capacity for symplectic manifolds. Rabinowitz, P., Zehnder, E. (eds.), pp. 405–428. New York: Academic Press 1990.
33. Lockhard, R., McOwen, R.: Elliptic operators on non compact manifolds. Ann. Sc. Norm. Sup. Pisa **12**(12), 409–446 (1985)
34. McDuff, D.: Elliptic methods in symplectic geometry. Bull. AMS **23**(2), 311–358 (1990)
35. Rabinowitz, P.: Periodic solutions of Hamiltonian systems. Comm. Pure Appl. Math. **31**, 157–184 (1978)
36. Rabinowitz, P.: Periodic solutions of Hamiltonian systems on a prescribed energy surface. J. Differ. Eq. **33**, 336–352 (1979)
37. Sachs, J., Uhlenbeck, K.K.: The existence of minimal 2-spheres. Ann. Math. **113**, 1–24 (1983)
38. Salamon, D.: Morse theory, the Conley index and Floer homology. Bull. L.M.S. 22, 113–140 (1990)
39. Salamon, D., Zehnder, E.: Morse theory for periodic solutions of Hamiltonian systems and the Maslov index. Comm. Pure Appl. Math. (to appear)
40. Salamon, D., Zehnder, E.: Analysis et cetera. Chapter: Floer homology, the Maslov index and periodic orbits of Hamiltonian equations, Rabinowitz, P., Zehnder, E. (eds.), pp. 573–600. New York: Adademic Press 1990
41. Sikorav, J.-C.: Rigidité symplectique dans le cotangent der t^n. Duke Math. J. **59**, 227–231 (1989)
42. Viterbo, C.: A proof of the Weinstein conjecture in $\mathbb{R}^{2n}$. Ann. Inst. Henri Poncaré, Analyse nonlinéaire **4**, 337–357 (1987)
43. Viterbo, C.: Capacités symplectiques et applications. Artéristique, 695 (1989) Séminaire Bourbaki
44. Viterbo, C.: Symplectic topology as the geometry of generating functions. Math. Ann. **292**, 685–710 (1992)
45. Witten, E.: Supersymmetry and Morse theory. J. Differ. Geom. **17**, 661–692 (1982)