

# Floer homology in symplectic geometry and in mirror symmetry

*Yong-Geun Oh and Kenji Fukaya*

*Department of Mathematics, University of Wisconsin, WI 53706, U.S.A. and Korea  
Institute for Advanced Study, Seoul, Korea*

*Department of Mathematics, Kyoto University, Kitashirakawa, Kyoto, Japan*

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In this article the authors review what the Floer homology is and what it does in symplectic geometry both in the closed string and in the open string context. In the first case, the authors will explain how the chain level Floer theory leads to the  $C^0$  symplectic invariants of Hamiltonian flows and to the study of topological Hamiltonian dynamics. In the second case, the authors explain how Floer's original construction of Lagrangian intersection Floer homology is obstructed in general as soon as one leaves the category of exact Lagrangian submanifolds. They will survey the construction of the Floer complex and describe its obstruction in terms of the filtered  $A_\infty$ -algebras. This can be promoted to the level of  $A_\infty$ -category (Fukaya category) of symplectic manifolds. Some applications of this general machinery to the study of the topology of Lagrangian embeddings in relation to symplectic topology and to mirror symmetry are also reviewed.