Floer theory for Hamiltonian PDE and the small divisor problem

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Hamiltonian Floer theory is the most important tool to prove the existence of periodic solutions of finite-dimensional Hamiltonian systems. In my talk I show how Hamiltonian Floer theory can be generalized to infinite dimensions in order to prove the existence of time-periodic solutions of important nonlinear PDEs like the nonlinear wave equation or the nonlinear Schrödinger equation. Apart from generalizing the tools from minimal surface theory to the infinite-dimensional setting, the main challenge is to deal with the newly arising small divisor problem. As main result we prove the existence of forced time- and space-periodic solutions for almost all time and space periods in the case when the nonlinearity is sufficiently regularizing.

References

[1] O. Fabert, Hamiltonian Floer theory for nonlinear Schrödinger equations and the small divisor problem, ArXiv preprint 1904.08830, 2019.