THE ANALYSIS BEHIND SYMPLECTIC FIELD THEORY

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OUTLINE

It is the aim of this series of lectures to describe a novel functional analytic set up, in which the compactified moduli spaces of pseudoholomorphic curves occur as zeros of sections of bundles over spaces having enough structure to talk about transversality, smoothness, Fredholm property, and abstract perturbations. In this category transversality will imply that the (compactified) moduli spaces carry natural smooth orbifold structures (with boundaries with corners, depending on the situation). The whole set-up allows to study problems in Symplectic Field Theory (SFT) or Gromov-Witten Theory in the spirit of the familiar theory of proper Fredholm sections of Banach bundles over Banach manifolds or their orbifold version. However, the category of ambient spaces will be quite different. The approach outlined above is still work in progress, but should ultimately lead to a representation of SFT as the composition of two functors, where the first associates to geometric (symplectic) data an (abstract) Fredholm problem (with so-called operations) and to the Fredholm problem algebraic data.

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