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Sinopsis

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The authors establish the general machinery of string topology for differentiable stacks. This machinery allows them to treat on equal footing free loops in stacks and hidden loops. They construct a bivariant (in the sense of Fulton and MacPherson) theory for topological stacks: it gives them a flexible theory of Gysin maps, which are automatically compatible with pullback, pushforward and products. Then the authors prove an excess formula in this context.

The authors introduce oriented stacks, generalizing oriented manifolds, which are stacks on which they can do string topology. They prove that the homology of the free loop stack of an oriented stack and the homology of hidden loops (sometimes called ghost loops) are Frobenius algebras which are related by a natural morphism of Frobenius algebras. They also prove that the homology of the free loop stack has a natural structure of BV -algebra which, together with the Frobenius structure, fits into homological conformal field theories with closed positive boundaries. They also use their constructions to study an analogue of the loop product for stacks of maps of (n -dimensional) spheres to oriented stacks and compatible power maps in their homology.

Using their general machinery, the authors construct an intersection pairing for (not necessarily compact) almost complex orbifolds which is in the same relation to the intersection pairing for manifolds as Chen-Ruan orbifold cup-product is to ordinary cup-product of manifolds. They show that the hidden product of almost complex orbifolds is isomorphic to the orbifold intersection pairing twisted by a canonical class. Finally they gave some examples, including the case of the classifying stacks [*/G] of a compact Lie group.

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Readership

Graduate students and research mathematicians interested in string topology, topological stacks, and loop stacks.

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