

## Extending Topological Surgery to Natural Processes

Topological surgery occurs in natural phenomena where two points are selected, forces are applied and the manifold in which they occur changes type. Inspired by such phenomena, we introduce new theoretical concepts which enhance the formal definition of topological surgery with the observed dynamics, thus making the static topological process of surgery an intrinsic and dynamic property of many natural phenomena. More precisely, we introduce local forces in the process of surgery and define the notion of solid topological surgery (where the interior is filled in). We also embed 2-dimensional topological surgery in the 3-sphere for modelling phenomena which involve more intrinsically the ambient space. Finally, we connect solid 2-dimensional surgery with a three-dimensional dynamical system. We hope that through this study the topology and dynamics of many natural phenomena will be better understood.

Key references:

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