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Effective computation of the Sullivan model of a topological space and its applications

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SUMMARY

Due to Sullivan, given a topological space X, it is known theoretically how to construct a commutative differential graded algebra, called the Sullivan model of the space, that is quasi-isomorphic to the normalized singular cochain algebra, $C^*(X)$. This object is an algebraic invariant of the space, and in some cases, it contains topological information of X. Here, we present an effective algorithm (with a concrete implementation) for the computation of the Sullivan model of a given topological space.

In this talk, we will: (1) introduce the notion of the Sullivan model of a space, (2) explain in which cases this model captures the topological information we are interested in, and (3) we will present an effective algorithm (with a concrete implementation) for the computation of the Sullivan model of this kind of topological spaces.

Keywords: Sullivan models, Rational Homotopy, Simplicial Complexes, Computation

AMS Classification: 55P62, 55U10, 55-08

References

[1] Y. Felix, S. Halperin, J.C. Thomas, *Rational homotopy theory*, Graduate Texts in Mathematics, 205. Springer-Verlag, New York, 2001.

[2] A. Garvin, R. Gonzalez-Diaz, M.A. Marco and B. Medrano, *Making Sullivan algebras minimal through chain contractions*, Mediterr. J. Math. (2021), No 43, 1660–5446

[3] V. Manero and M.A. Marco-Buzunáriz, *Effective computation of degree bounded minimal models of GCDAs*, J. Softw. Algebra Geom. (2020), No 1, 25–39

[4] The Sage Developers, the Sage Mathematics Software System (Version 9.5), 2022, `https://www.sagemath.org`.

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