Guaranteeing the homotopy type of a set defined by non-linear inequalities

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Résumé en anglais	This paper provides an effective method to create an abstract simplicial complex homotopy equivalent to a given set S described by non-linear inequalities (polynomial or not). To our knowledge, no other numerical algorithm is able to deal with this type of problem. The proposed approach divides S into subsets that have been proven to be contractible using interval arithmetic. The method is close to Čech cohomology and uses the nerve theorem. Some examples illustrate the principle of the approach. This algorithm has been implemented.
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[1] http://okina.univ-angers.fr/nicolas.delanoue/publications
[2] http://okina.univ-angers.fr/publications?f[author]=2012
[3] http://okina.univ-angers.fr/bertrand.cottenceau/publications
[4] http://okina.univ-angers.fr/publications?f[keyword]=9786
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