

READ ME

This folder contains the formalisation of various results in the theory of free groups, which are described in the paper “Formalizing Free Groups in Isabelle/HOL: The Nielsen-Schreier Theorem and the Conjugacy Problem.

The following files are a part of the formalisation and contain original work by the author(s):

1. Cancellation.thy
2. Conjugacy.thy
3. Conjugacy_Problem.thy
4. Distinct_Inverse.thy
5. FreeGroupMain.thy
6. Freegroup_with_Basis.thy
7. Minimal.thy
8. NielsenScheier.thy
9. N_Properties.thy
10. UniversalProperty.thy
11. Word_Problem.thy

Following file, which is a part of an archive of formal proof distribution, has been added only for the purpose of the ease of the review by reviewers. It contains a truncated version of the original file.

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1. Generators.thy

The following files contain the Haskell code extracted from our formalisation, using Isabelle’s code generation, for the Word Problem and Conjugacy Problem respectively.

1. WP.hs
2. CP.hs

The formal constructions provided in the paper can be found in the following files:

Section 4.1 : All definitions are in FreeGroupMain.thy

Section 4.2: The definition `reduce` is in FreeGroupMain.thy, the `word__problem__reduce` can be found in Word_Problem.thy

Section 4.3: `is_freegroup` can be found in FreeGroupMain.thy. `fg__with__basis` can be found in FreeGroup_With_Basis.thy

Section 4.4: All the lemmas contained are in the file- UniversalProperty.thy. The definition `gen__span` is contained in Generators.thy.

Section 5: All the results are in Conjugacy_Problem.thy

Section 6.1 and Section 6.2: All the definitions and results are in N_Properties.thy

Section 6.3: Definition of G , X and the lemma `span__X__eq__SG` are in N_Properties.thy
Lemma `N__reduced__X` and `Nielson__Schreier` are in Nielsen_Schreier.thy

To run all the files in the formalization (along with their dependencies), one could simply run Nielsen_Schreier.thy