

- [Return to Algorithm](#)

## RatProbNorm1Tori for GAP 4 ver.2024.08.21

**Authors:** [Akinari Hoshi](#), [Aiichi Yamasaki](#).

**Needs:** [GAP](#), version  $\geq 4.4.12$ ;

**Current version:** [RatProbNorm1Tori-2024.08.21.zip](#)

(Data files [PSL28bpQ.dat](#), [PSL28E8bpS.dat](#) were added)

**Old version 2:** [RatProbNorm1Toriver.2023.09.28.zip](#)

([IsInvertible](#), [SearchPRowBlocks](#), [SearchP1](#), [SearchPFilterRowBlocks](#), [SearchPFilterRowBlocksRandomMT](#), [SearchPMergeRowBlock](#), [SearchPLinear](#), [SearchPBilinear](#), [SearchPQuadratic](#), [Hcandidates](#), [Norm1TorusJTransitiveGroup](#), [Norm1TorusJPermutationGroup](#), [Norm1TorusJCoset](#), [Norm1TorusITransitiveGroup](#), [Norm1TorusIPermutationGroup](#), [TransformationMatPari](#), [TransformationMatPerm](#), [StablyPermutationCheckHPPari](#), [StablyPermutationMCheckPPari](#), [StablyPermutationFCheckPPari](#), [StablyPermutationFCheckPFromBasePari](#) in [FlabbyResolutionFromBase.gap](#) were added)

**Old version 1:** [RatProbNorm1Toriver.2018.11.05.zip](#)

**Contact:** [Akinari Hoshi](#), [Aiichi Yamasaki](#).

**URL:**

<http://mathweb.sc.niigata-u.ac.jp/~hoshi/Algorithm/RatProbNorm1Tori/index.html>

<https://www.math.kyoto-u.ac.jp/~yamasaki/Algorithm/RatProbNorm1Tori/index.html>

## Description

This code provides algorithms for (stably, retract) rationality problem for norm one tori.

## Installation

Download [RatProbNorm1Tori-2024.08.21.zip](#) and unpack it to some folder (e.g. C:\Users\*username*).

Then type "Read("FlabbyResolutionFromBase.gap");" on GAP.

In order to use the functions [TransformationMatPari](#), [StablyPermutationCheckHPPari](#), [StablyPermutationMCheckPPari](#), [StablyPermutationFCheckPPari](#), [StablyPermutationFCheckPFromBasePari](#), an installation of PARI/GP [PARI2] is needed.

Then add the PARI/GP directory (e.g. C:\Program Files (x86)\Pari64-2-13-3) to PATH.

## Documentation

FlabbyResolutionFromBase [[.html](#), [.pdf](#)]

README [[.html](#), [.pdf](#)]

## Content

```
RatProbNorm1Tori-2024.08.21.zip+-FlabbyResolutionFromBase.gap
+-FlabbyResolutionFromBase.pdf
+-FlabbyResolutionFromBasever.2018.11.05.gap
+-PSL28bpQ.dat
+-PSL28E8bpS.dat
+-README.txt
+-README.pdf
+-RatProbNorm1Tori-2024.08.21.pdf
```

## References

[HY17] Akinari Hoshi and Aiichi Yamasaki, Rationality problem for algebraic tori, Mem. Amer. Math. Soc. **248** (2017) no. 1176, v+215 pp. [AMS](#) Preprint version: [arXiv:1210.4525](#).

[HHY20] Sumito Hasegawa, Akinari Hoshi and Aiichi Yamasaki, Rationality problem for norm one tori in small dimensions, Math. Comp. **89** (2020) 923-940. [AMS](#) Extended version: [arXiv:1811.02145](#).

[HY] Akinari Hoshi and Aiichi Yamasaki, Rationality problem for norm one tori for  $A_5$  and  $\mathrm{PSL}_2(\mathbb{F}_8)$  extensions, [arXiv:2309.16187](#).

[PARI2] The PARI Group, PARI/GP version 2.13.3, Univ. Bordeaux, 2021, <http://pari.math.u-bordeaux.fr/>.

RatProbNorm1Tori is a free software.

Copyright © 2018 Akinari Hoshi, Aiichi Yamasaki

Last modified: 2024-09-25