

Addendum:
List of Stabilizers of Cells in Boundary of the Standard 4-Cell REDSQUARE
of the Dissertation:
A Toolbox to Compute the Cohomology of Arithmetic Groups in Case of the Group
 $\mathrm{Sp}_2(\mathbb{Z})$

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In this document we present for all cells in the closure of REDSQUARE the stabilizer in terms of a list of its elements.

1 Stabilizer of the Cell REDSQUARE

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2 Stabilizers of Cells of Type DESARGUES

| Name | Stabilizer Elements |
|------------------------|--|
| DESARGUES ₀ | $\begin{pmatrix} -1 & 0 & 0 & 0 \\ 0 & -1 & 0 & 0 \\ 0 & 0 & -1 & 0 \\ 0 & 0 & 0 & -1 \end{pmatrix}, \begin{pmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{pmatrix}, \begin{pmatrix} 0 & 0 & -1 & -1 \\ -1 & 1 & 0 & -1 \\ 0 & 0 & 0 & -1 \\ 0 & 1 & 0 & 0 \end{pmatrix}, \begin{pmatrix} 0 & 0 & 1 & 1 \\ 1 & -1 & 0 & 1 \\ 0 & 0 & 0 & 1 \\ 0 & -1 & 0 & 0 \end{pmatrix}, \begin{pmatrix} 0 & 1 & -1 & -1 \\ 0 & 0 & 0 & -1 \\ 1 & 0 & -1 & 0 \\ 0 & 0 & 1 & 0 \end{pmatrix},$ $\begin{pmatrix} 0 & -1 & 1 & 1 \\ 0 & 0 & 0 & 1 \\ -1 & 0 & 1 & 0 \\ 0 & 0 & -1 & 0 \end{pmatrix}, \begin{pmatrix} 0 & 1 & 0 & -1 \\ 1 & 0 & -1 & 0 \\ 0 & 1 & 0 & 0 \\ 1 & -1 & 0 & 1 \end{pmatrix}, \begin{pmatrix} 0 & -1 & 0 & 1 \\ -1 & 0 & 1 & 0 \\ 0 & -1 & 0 & 0 \\ -1 & 1 & 0 & -1 \end{pmatrix}, \begin{pmatrix} -1 & 0 & 0 & -1 \\ 0 & 0 & -1 & 0 \\ -1 & 1 & 0 & -1 \\ 1 & 0 & -1 & 0 \end{pmatrix},$ $\begin{pmatrix} 1 & 0 & 0 & 1 \\ 0 & 0 & 1 & 0 \\ 1 & -1 & 0 & 1 \\ -1 & 0 & 1 & 0 \end{pmatrix}$ |

[illegible]

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[illegible]

[illegible]

[illegible]

| Name | Stabilizer Elements |
|-------------------------|--|
| DESARGUES ₄₇ | $\begin{pmatrix} -1 & 0 & 0 & 0 \\ 0 & -1 & 0 & 0 \\ 0 & 0 & -1 & 0 \\ 0 & 0 & 0 & -1 \end{pmatrix}, \quad \begin{pmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{pmatrix}, \quad \begin{pmatrix} 0 & 0 & 0 & -1 \\ 0 & 0 & -1 & -1 \\ 0 & 1 & 0 & 0 \\ 1 & -1 & 0 & 1 \end{pmatrix}, \quad \begin{pmatrix} 0 & 0 & 0 & 1 \\ 0 & 0 & 1 & 1 \\ 0 & -1 & 0 & 0 \\ -1 & 1 & 0 & -1 \end{pmatrix},$ $\begin{pmatrix} -1 & 1 & 0 & -1 \\ -1 & 0 & 0 & -1 \\ 0 & 0 & -1 & -1 \\ 1 & -1 & 1 & 1 \end{pmatrix}, \quad \begin{pmatrix} 1 & -1 & 0 & 1 \\ 1 & 0 & 0 & 1 \\ 0 & 0 & 1 & 1 \\ -1 & 1 & -1 & -1 \end{pmatrix}, \quad \begin{pmatrix} -1 & 0 & -1 & -1 \\ 0 & 0 & -1 & 0 \\ -1 & 1 & 0 & 0 \\ 1 & 0 & 0 & 0 \end{pmatrix}, \quad \begin{pmatrix} 1 & 0 & 1 & 1 \\ 0 & 0 & 1 & 0 \\ 1 & -1 & 0 & 0 \\ -1 & 0 & 0 & 0 \end{pmatrix},$ $\begin{pmatrix} -1 & 1 & -1 & -1 \\ -1 & 1 & 0 & 0 \\ -1 & 0 & 0 & -1 \\ 1 & 0 & 1 & 1 \end{pmatrix}, \quad \begin{pmatrix} 1 & -1 & 1 & 1 \\ 1 & -1 & 0 & 0 \\ 1 & 0 & 0 & 1 \\ -1 & 0 & -1 & -1 \end{pmatrix}$ |

3 Stabilizers of Cells of Type REYE

[illegible]

[illegible]

[illegible]

17

[illegible]

[illegible]

[illegible]REYE₉

[illegible]

[illegible]

[illegible]

REYE₂₂

[illegible]

[illegible]

[illegible]

[illegible]

5 Stabilizers of Cells of Type RR

[illegible]

[illegible]

54

[illegible]

58

[illegible]

6 Stabilizers of Cells of Type HEXAGON

[illegible]

[illegible]

[illegible]

7 Stabilizers of Cells of Type SQUARE

[illegible]

[illegible]

[illegible]

| Name | Stabilizer Elements |
|----------------------|--|
| SQUARE ₆₃ | $\begin{pmatrix} -1 & 0 & 0 & 0 \\ 0 & -1 & 0 & 0 \\ 0 & 0 & -1 & 0 \\ 0 & 0 & 0 & -1 \end{pmatrix}, \begin{pmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{pmatrix}, \begin{pmatrix} 1 & -1 & 0 & 0 \\ 0 & -1 & 0 & 0 \\ 0 & 0 & -1 & -1 \\ 0 & 0 & 0 & 1 \end{pmatrix}, \begin{pmatrix} -1 & 1 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 1 \\ 0 & 0 & 0 & -1 \end{pmatrix}$ |

[illegible]

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[illegible]

[illegible]

[illegible]

| Name | Stabilizer Elements |
|-------------------------|--|
| TRIANGLE ₁₀₉ | $\begin{pmatrix} -1 & 0 & 0 & 0 \\ 0 & -1 & 0 & 0 \\ 0 & 0 & -1 & 0 \\ 0 & 0 & 0 & -1 \end{pmatrix}, \begin{pmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{pmatrix}$ |
| TRIANGLE ₁₁₀ | $\begin{pmatrix} -1 & 0 & 0 & 0 \\ 0 & -1 & 0 & 0 \\ 0 & 0 & -1 & 0 \\ 0 & 0 & 0 & -1 \end{pmatrix}, \begin{pmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{pmatrix}$ |
| TRIANGLE ₁₁₁ | $\begin{pmatrix} -1 & 0 & 0 & 0 \\ 0 & -1 & 0 & 0 \\ 0 & 0 & -1 & 0 \\ 0 & 0 & 0 & -1 \end{pmatrix}, \begin{pmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{pmatrix}$ |

9 Stabilizers of Cells of Type VERTEBRA

[illegible]

76

10 Stabilizers of Cells of Type CRYSTAL

[illegible]

[illegible]

| Name | Stabilizer Elements |
|----------------------|--|
| PYRAMID ₀ | $\begin{pmatrix} -1 & 0 & 0 & 0 \\ 0 & -1 & 0 & 0 \\ 0 & 0 & -1 & 0 \\ 0 & 0 & 0 & -1 \end{pmatrix}, \begin{pmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{pmatrix}, \begin{pmatrix} -1 & 0 & 1 & 0 \\ -1 & 1 & 0 & -1 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & -1 & -1 \end{pmatrix}, \begin{pmatrix} 1 & 0 & -1 & 0 \\ 1 & -1 & 0 & 1 \\ 0 & 0 & -1 & 0 \\ 0 & 0 & 1 & 1 \end{pmatrix}$ |
| PYRAMID ₁ | $\begin{pmatrix} -1 & 0 & 0 & 0 \\ 0 & -1 & 0 & 0 \\ 0 & 0 & -1 & 0 \\ 0 & 0 & 0 & -1 \end{pmatrix}, \begin{pmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{pmatrix}, \begin{pmatrix} 1 & 0 & 1 & 0 \\ -1 & -1 & 0 & -1 \\ 0 & 0 & -1 & 0 \\ 0 & 0 & -1 & 1 \end{pmatrix}, \begin{pmatrix} -1 & 0 & -1 & 0 \\ 1 & 1 & 0 & 1 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 1 & -1 \end{pmatrix}$ |

[illegible]

[illegible]