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KS.gap

Definition of M_G

Let G be a finite subgroup of $GL(n, \mathbb{Z})$. The G -lattice M_G of rank n is defined to be the G -lattice with a \mathbb{Z} -basis $\{u_1, \dots, u_n\}$ on which G acts by $\sigma(u_i) = \sum_{j=1}^n a_{i,j} u_j$ for any $\sigma = [a_{i,j}] \in G$.

DirectSumMatrixGroup

▸ `DirectSumMatrixGroup(l)`

returns the direct sum of the groups G_1, \dots, G_n for the list $l = [G_1, \dots, G_n]$.

DirectProductMatrixGroup

▸ `DirectProductMatrixGroup(l)`

returns the direct product of the groups G_1, \dots, G_n for the list $l = [G_1, \dots, G_n]$.

IndmfMatrixGroup

▸ `IndmfMatrixGroup(n, i, j)`

returns $\text{Indmf}(n, i, j)$ of dimension n (this works only for $n \leq 6$).

IndmfNumberQClasses

▸ `IndmfNumberQClasses(n)`

returns the number of \mathbb{Q} -classes of all the indecomposable maximal finite groups of dimension n (this works only for $n \leq 6$).

IndmfNumberZClasses

▸ `IndmfNumberZClasses(n, i)`

returns the number of \mathbb{Z} -classes in the i -th \mathbb{Q} -class of the indecomposable maximal finite groups $\text{Imf}(n, i, j)$ of dimension n (this works only for $n \leq 6$).

AllImfMatrixGroups

▸ `AllImfMatrixGroups(n)`

returns all the irreducible maximal finite groups of dimension n .

AllIndmfMatrixGroups

```
▸ AllIndmfMatrixGroups( $n$ )
```

returns all the indecomposable maximal finite groups of dimension n .

InverseProjection

```
▸ InverseProjection( $[l_1, l_2]$ )
```

returns the list of all groups G such that $M_G \simeq M_{G_1} \oplus M_{G_2}$ and the CrystCat ID of G_1 (resp. G_2) is l_1 (resp. l_2).

```
▸ AllIndmfMatrixGroups( $n$ :Carat)
```

returns the same as `InverseProjection($[l_1, l_2]$)` but with respect to the Carat ID l_1 and l_2 instead of the CrystCat ID.

MaximalGroupsID

```
▸ MaximalGroupsID( $L$ )
```

returns the list of the CrystCat IDs of the maximal \mathbb{Z} -classes in the groups of the CrystCat IDs L .

```
▸ MaximalGroupsID( $L$ :Carat)
```

returns the same as `MaximalGroupsID(L)` but using the Carat ID instead of the CrystCat ID.

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](#).

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