

MYTITLE

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1. Modules

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1. MODULES

Exercise. (Problem 6) Take four 4×4 matrices with integer entries and check if the abelian group presented by the matrix is cyclic.

Proof.

$$\begin{aligned} & \begin{bmatrix} -166 & -74 & 254 & 347 \\ 140 & -93 & 246 & 425 \\ -196 & 57 & -363 & 202 \\ 325 & 257 & 314 & -389 \end{bmatrix} \rightarrow [18444530375 \quad 1 \quad 1 \quad 1] \\ & \begin{bmatrix} 237 & -81 & 332 & -132 \\ 95 & 268 & 229 & 498 \\ 387 & 213 & 46 & 55 \\ 88 & -126 & -380 & -447 \end{bmatrix} \rightarrow [2610768268 \quad 1 \quad 1 \quad 1] \\ & \begin{bmatrix} -275 & -22 & -207 & -276 \\ -469 & -342 & 240 & -101 \\ -41 & 455 & 51 & -151 \\ 267 & -450 & 98 & -40 \end{bmatrix} \rightarrow [33644517767 \quad 1 \quad 1 \quad 1] \\ & \begin{bmatrix} 48 & 29 & 22 & -481 \\ 388 & -468 & -137 & -491 \\ 84 & -352 & 85 & -384 \\ -226 & -486 & 102 & -156 \end{bmatrix} = [13267264454 \quad 1 \quad 1 \quad 1] \end{aligned}$$

Each of the groups contains 4 generators, so none of them are cyclic.

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