CCFU Proof 23

$$\dim \mathrm{Stab}(\Omega_W) = 14$$

Given. $\Omega_W = e_{014} + e_{025} + e_{036} + e_{123} + e_{456}$ [Proof 22].

Action of $X \in \mathfrak{gl}(7)$ on Ω_W:

$$(X \cdot \Omega_W)_{ijk} = \sum_l \big(X_{li}\, \Omega_{ljk} + X_{lj}\, \Omega_{ilk} + X_{lk}\, \Omega_{ijl} \big).$$

This defines a 35×49 matrix A.

Exact computation. Arithmetic over $\mathbb{Q}$ (Python `Fraction`). No floating point.

$$\mathrm{rank}(A) = 35, \qquad \dim \ker(A) = 49 - 35 = 14. \blacksquare$$

Note. The matrix has only 5 nonzero triples (vs 7 in the classical representative), making hand verification feasible.

[Dependency: Proof 22.]