

Let $M = n\ell$, and let D_M act on $S_\ell^n(r)$. The number of orbits is

$$\left\{ \begin{array}{ll} \frac{1}{2M} \left[\sum_{\substack{d \mid \gcd(n,r) \\ \gcd(d,\ell)=1}} \phi(d) \binom{n/d}{r/d} \ell^{r/d} + M \binom{\frac{n-1}{2}}{\frac{r}{2}} \ell^{\frac{r}{2}} \right], & \text{if } n \text{ is odd and } r \text{ is even;} \\ \frac{1}{2M} \left[\sum_{\substack{d \mid \gcd(n,r) \\ \gcd(d,\ell)=1}} \phi(d) \binom{n/d}{r/d} \ell^{r/d} + M \binom{\frac{n-1}{2}}{\frac{r-1}{2}} \ell^{\frac{r-1}{2}} \right], & \text{if } n \text{ is odd and } r \text{ is odd;} \\ \frac{1}{2M} \left[\sum_{\substack{d \mid \gcd(n,r) \\ \gcd(d,\ell)=1}} \phi(d) \binom{n/d}{r/d} \ell^{r/d} + \frac{M}{2} \left[2\ell \binom{\frac{n-2}{2}}{\frac{r}{2}} + \binom{\frac{n-2}{2}}{\frac{r-2}{2}} \right] \ell^{\frac{r-2}{2}} \right], & \text{if } n \text{ is even, } \ell \text{ is odd, and } r \text{ is even;} \\ \frac{1}{2M} \left[\sum_{\substack{d \mid \gcd(n,r) \\ \gcd(d,\ell)=1}} \phi(d) \binom{n/d}{r/d} \ell^{r/d} + M \binom{\frac{n-2}{2}}{\frac{r-1}{2}} \ell^{\frac{r-1}{2}} \right], & \text{if } n \text{ is even, } \ell \text{ is odd, and } r \text{ is odd;} \\ \frac{1}{2M} \left[\sum_{\substack{d \mid \gcd(n,r) \\ \gcd(d,\ell)=1}} \phi(d) \binom{n/d}{r/d} \ell^{r/d} + \frac{M}{2} \left[\binom{\frac{n-2}{2}}{\frac{r}{2}} + \binom{\frac{n}{2}}{\frac{r}{2}} \right] \ell^{\frac{r}{2}} \right], & \text{if } n \text{ is even, } \ell \text{ is even, and } r \text{ is even;} \\ \frac{1}{2M} \left[\sum_{\substack{d \mid \gcd(n,r) \\ \gcd(d,\ell)=1}} \phi(d) \binom{n/d}{r/d} \ell^{r/d} + M \binom{\frac{n-2}{2}}{\frac{r-1}{2}} \ell^{\frac{r-1}{2}} \right], & \text{if } n \text{ is even, } \ell \text{ is even, and } r \text{ is odd.} \end{array} \right.$$

The new ingredients in the formulas are the sum of $\text{fix}(\beta)$, summed over all reflections β . Here are the expressions for $\text{fix}(\beta)$ that I found. In the case ℓ and n both odd, all M reflections are essentially $\beta(x) = -x \pmod{M}$. In the other three cases, $M/2$ are of that form, and the other $M/2$ are of the form $\beta(x) = 1 - x \pmod{M}$.

| parity of n | parity of ℓ | parity of r | $\beta(x) = -x$ | $\beta(x) = 1 - x$ |
|---------------|------------------|---------------|--|---|
| odd | odd | even | $\text{fix}_r(\beta) = \binom{\frac{n-1}{2}}{\frac{r}{2}} \ell^{\frac{r}{2}}$ | _____ |
| odd | odd | odd | $\text{fix}_r(\beta) = \binom{\frac{n-1}{2}}{\frac{r-1}{2}} \ell^{\frac{r-1}{2}}$ | _____ |
| odd | even | even | $\text{fix}_r(\beta) = \binom{\frac{n-1}{2}}{\frac{r}{2}} \ell^{\frac{r}{2}}$ | $\text{fix}_r(\beta) = \binom{\frac{n-1}{2}}{\frac{r}{2}} \ell^{\frac{r}{2}}$ |
| odd | even | odd | $\text{fix}_r(\beta) = 2 \binom{\frac{n-1}{2}}{\frac{r-1}{2}} \ell^{\frac{r-1}{2}}$ | $\text{fix}_r(\beta) = 0$ |
| even | odd | even | $\text{fix}_r(\beta) = \left[\binom{\frac{n-2}{2}}{\frac{r}{2}} + \ell \binom{\frac{n-2}{2}}{\frac{r-2}{2}} \right] \ell^{\frac{r-2}{2}}$ | $\text{fix}_r(\beta) = \binom{\frac{n}{2}}{\frac{r}{2}} \ell^{\frac{r}{2}}$ |

| | | | | |
|------|------|------|---|---|
| even | odd | odd | $\text{fix}_r(\beta) = 2 \binom{\frac{n-2}{2}}{\frac{r-1}{2}} \ell^{\frac{r-1}{2}}$ | $\text{fix}_r(\beta) = 0$ |
| even | even | even | $\text{fix}_r(\beta) = \binom{\frac{n-2}{2}}{\frac{r}{2}} \ell^{\frac{r}{2}}$ | $\text{fix}_r(\beta) = \binom{\frac{n}{2}}{\frac{r}{2}} \ell^{\frac{r}{2}}$ |
| even | even | odd | $\text{fix}_r(\beta) = 2 \binom{\frac{n-2}{2}}{\frac{r-1}{2}} \ell^{\frac{r-1}{2}}$ | $\text{fix}_r(\beta) = 0$ |