Cayley graph G of the mapping class group of the surface with respect to $\mathbb{Z}_2^{\frac{k(k-1)}{2}}$

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Suppose $k \in \mathbb{N}$ and $k \geqslant 2$ such that $2^k - 1$ is not divisible by k. Let S_0 and S_1 be the sets of all non-zero elements $\alpha \in GF(2^k)$ so that the leftmost bit in the binary representation of α^k is 0 and 1 respectively. As $|S_0| = 2^{k-1} - 1$ and $|S_1| = 2^{k-1}$, define G to be a Cayley graph of additive group $\mathbb{Z}_2^{\frac{k(k-1)}{2}}$ with respect to the related generating set consisting of the $\frac{k(k-1)}{2}$ standard basis vectors. Clearly, G is a $2^{k-1}(2^{k-1}-1)$-regular graph with $\frac{k(k-1)}{2}$ vertices. Since $\mathbb{Z}_2^{\frac{k(k-1)}{2}}$ is a finite group, its mapping class group is trivial. We also look up to find its maximum cycle length and eigenvalues of G.

References

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