

CORR 2001-10

Cayley Maps

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Abstract We present a theory of Cayley maps, i.e., embeddings of Cayley graphs into oriented surfaces having the same cyclic rotation of generators around each vertex. These maps have often been used to encode symmetric embeddings of graphs. We also present an algebraic theory of Cayley maps and we apply the theory to determine exactly which regular or edge-transitive tilings of the sphere or plane are Cayley graphs. Our main goal, however, is to provide the general theory so as to make it easier for others to study Cayley maps.