

1052-11-203

Anthony Weaver* (anthonyweaver@mac.com) and **Cormac O'Sullivan**. *The largest non-genus of a cyclic group.*

There is a largest positive integer g such that no surface of genus g is an n -fold regular cover of another surface. What is g ? The answer is easy if n is prime, not much harder if n is prime power, and NP-hard if n has a composite, square-free factor. We treat the simplest "hard" case: when n is a product of two distinct primes. The question in this case is a four-dimensional version of a famous old problem in elementary number theory: the linear Diophantine problem of Frobenius. We obtain bounds on g , and exact formulae for certain large (infinite) classes of prime pairs. The bounds are stated in terms of the quotient and remainder of the larger prime on division by the smaller. Surprisingly, they depend heavily on the sum of those two integers – in particular, on whether the sum is less or greater than the smaller prime. A slight specialization of the question is: what is the largest g such that no surface of genus g admits a cyclic group of automorphisms of order n ? In most cases, the extra requirement of a group action (as opposed to a merely regular covering) makes no difference to the answer. (Received August 28, 2009)