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On periodic homeomorphisms of spheres

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ABSTRACT

A theorem of Newman states that periodic homeomorphism of a manifold cannot have arbitrary small orbits. For an periodic homeomorphism of a manifold let us call its *orbital diameter* the maximum of diameters of its orbits. We will call by *Newman diameter* of a manifold the infinum of the orbital diameters of periodic homeomorphisms.

Theorem 1. *The Newman diameter of the unit sphere can not be less than the diameter of the right tetrahedra inscribed in it.*

Let p be a prime number. Let us define p-periodic diameter of the sphere as minimum of the orbital diameters of homeomorphisms which has the period p.

Theorem 2. *p-periodic diameter of the unit n-sphere coincides with the diameter of regular p-polygon inscribed in the unit circle, if $p = 3, 5$.*

The natural conjecture is that this theorem is true for all p.

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