ON THE RELATION BETWEEN RADII AND CURVATURES OF MUTUALLY TANGENT SPHERES

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Abstract

We supply a proof for the formula linking the radii of mutually tangent spheres and derive a generalized relation between the curvatures of the tangent spheres. We base our proof on the simplest properties of the determinant theory. In order to derive the connection between the curvatures of the tangent spheres, we invert the location of the spheres. By means of substituting known expressions for a single sphere, we obtain a subsidiary expression for the sum of squared dot products of a vector pointing from the centre of the system to an arbitrary point and vectors pointing from the centre of the system to the simplex vertices. We supply a proof that confirms the validity of generalising the formula to link the curvatures of spheres.

Keywords

Determinant, plane, mutually tangent circles, spheres, curvature, Soddy's formula, radius, Euclidean space

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