Spheres Inscribed Within a Ring Torus

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This study aimed to develop a theorem that algebraically calculates the maximum number of spheres inscribed within a ring torus and its resulting total volume. A ring torus is a circle with radius (r) rotated around an external axis. Defined as a "donut," it is measured through its major (R) and minor (r) radii, where (0<r<R). Moreover, the inscribed sphere is a sphere with radius (r) inside the tube of the ring torus. To date, there is no way to algebraically calculate the maximum number of spheres inscribed within a ring torus, (n). Thus, the researchers derived a theorem for (n) being n = ?p/sin?¹(r/R)?, and its resulting total volume, V? = (?p/sin?¹(r/R)?)(4pr³/3). This research may be used in various fields of pure mathematics. Moreover, these findings may have practical applications in materials science and engineering.

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