Abstract

We discuss the effect of confinement on the topology and geometry of tightly confined random walks and polygons. Here the walks and polygons are confined in a sphere of radius $R \geq 1/2$ and the polygons are equilateral with $n$ edges of unit length. We illustrate numerically that for a fixed length of random polygons the knotting probability increases to one as the radius decreases to 1/2. We also demonstrate that for random polygons (walks) the curvature increases to $\pi n \ (\pi (n - 1))$ as the radius approaches 1/2 and that the torsion decreases to $\approx \pi n/3 \ (\approx \pi (n - 1)/3)$. In addition we show the effect of length and confinement on the average crossing number of a random polygon.