Answer on Question #72276 – Math – Differential Geometry | Topology

Question

Torsion is defined only when $k(s) \neq 0$ (why?)

Solution

The torsion is given by

$$k_1(s) = \frac{r' \cdot (r'' \times r''')}{(r' \times r'')^2}$$

The curvature is given by

$$k(s) = \frac{r' \times r''}{|r'|^3}$$

where $r(s)$ is a vector with coordinates $x(s), y(s), z(s)$.

So, if $k(s) = 0$ then $r' \times r'' = 0$, and torsion will not be defined due to a division by zero.