The complex curvature is the inverse of the complex radius

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Abstract

I don't know if anyone else has noticed, but if we consider that the radius and pitch of the helix is a complex number, then the curvature and torsion can be JUST THE INVERSE of this complex number.

It is known that for a helix of radius a and step b its curvature is given by the formula

$$\kappa = \frac{a}{a^2+b^2},$$

and the torsion is

$$\tau = -\frac{b}{a^2+b^2}.$$

I don't know if anyone else has noticed, but if we consider that the radius and pitch of the helix is a complex number, then the curvature and torsion can be JUST THE INVERSE of this complex number.

In other words, if we admit that there is a complex number

$$r = a + bi,$$

where *a* and *b* are the radius and pitch of the helix (a number we might call a "complex radius"), then the complex number

$$\lambda = \kappa + \tau i$$

formed by the curvature and torsion of the helix (a number we might call "complex curvature") is just the inverse of z, ie

$$\lambda = \frac{1}{r}.$$

Bibliography

1. Daniel Breaz, ..., Transformări integrale și funcții complexe aplicate în tehnică
2. Helix on Wikipedia.