ON OSCULATING CIRCLE AND CURVATURE IN 2D

TRUONG-SON VAN

1. Introduction

In this expository note, we derive the relationship between curvature and the radius of the osculating circle. In particular, let p be a point on a twice differentiable curve, R be the radius of the osculating circle at that point and κ is the curvature of the curve at that point. Then,

$$R = \frac{1}{\kappa}\,.$$

From Wikipedia, the definition of an osculating circle is the following.

Definition 1.1. The osculating circle of a sufficiently smooth plane curve at a given point p on the curve has been traditionally defined as the circle passing through p and a pair of additional points on the curve infinitesimally close to p.

Fulbright University Vietnam
Email address: son.van@fulbright.edu.vn

Date: February 24, 2023.