

Assignment 2 in Differential Geometry of curves and surfaces (Math 439)

due Sep 10, 2012

Problem 6 below gives 20 points bonus. You can get 120 points in total for this assignment

1. Find an arc length parametrization of the curve that have the same orientation as the given curve

(a) $\alpha(t) = (\frac{1}{3}t^3, \frac{1}{2}t^2), \quad t \geq 0;$

(b) $\alpha(t) = (e^t \cos t, e^t \sin t), \quad 0 \leq t \leq \frac{\pi}{2}.$

2. Use the formulas for curvature from Exercise 12 b) or d) after section 1.5, page 25 (where the sign \wedge from the book means the cross product of vectors) to find the curvature $k(t)$ of the curve $\alpha(t)$, if

(a) $\alpha(t) = (e^{3t}, e^{-t});$

(b) $\alpha(t) = (t, \frac{1}{2}t^2, \frac{1}{3}t^3).$

3. Section 1.5 p. 23 : Exercises 7a,

4. Section 1.5 p. 24: Exercise 8.

5. Section 1.5 pp 25-26: Exercise 14

6. **(bonus 20 points)**

Section 1.5 p. 25: Exercise 12.