

## DIFFERENTIAL GEOMETRY HOMEWORK 2

LECTURER: SIU-CHEONG LAU

- (1) Compute the Frenet frame and curvature of the spiral  $r = a\phi$  where  $a$  is a constant and  $(r, \phi)$  is the polar coordinate system.
- (2) Show that a space curve  $c$  is a part of a helix implies the Darboux rotation vector  $D = \tau e_1 + \kappa e_3$  is constant.  $\{e_1, e_2, e_3\}$  is the Frenet frame;  $\kappa$  and  $\tau$  are the curvature and torsion respectively. BONUS: show that the converse is also true.

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