

$$v = (\sqrt{2}t, e^t, e^{-t})$$

$$v' = (\sqrt{2}, e^t, -e^{-t})$$

$$v'' = (0, e^t, e^{-t})$$

$$v''' = (0, e^t, -e^{-t})$$

$$|v'| = \sqrt{2 + e^{2t} + e^{-2t}} = e^t + e^{-t}$$

$$v' \times v'' = (e^t \cdot e^{-t} - (-e^{-t}) \cdot e^t, (-e^{-t}) \cdot 0 - \sqrt{2} \cdot e^{-t}, \sqrt{2} \cdot e^t - e^t \cdot 0) = \sqrt{2}(\sqrt{2}, -e^{-t}, e^t)$$

$$|v' \times v''| = \sqrt{2}(e^t + e^{-t})$$

$$\text{curvature } k = \frac{|v' \times v''|}{|v'|^3} = \frac{\sqrt{2}}{(e^t + e^{-t})^2}$$

$$(v' \times v'') \cdot v''' = \sqrt{2}(\sqrt{2} \cdot 0 + (-e^{-t}) \cdot e^t + e^t \cdot (-e^{-t})) = -2\sqrt{2}$$

$$\text{torsion } \frac{(v' \times v'') \cdot v'''}{|v' \times v''|^2} = \frac{-2\sqrt{2}}{2(e^t + e^{-t})^2} = \frac{-\sqrt{2}}{(e^t + e^{-t})^2}$$

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