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| **Student’s Name** | **Student’s ID** | **Group Number** | **Lecturer’s Name** |
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| **Question Number** | **I** | **II** | **III** | **IV** | **Total** |
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| **Question I: Define a regular curve. Decide which of the following curves are regular:**1. $α:\left(-1,1\right)\rightarrow R^{3}, defined as α\left(t\right)=(sinht-cosht, sinht, t^{2} ) $

**(b)** $β:\left(-\frac{π}{2},\frac{π}{2}\right)\rightarrow R^{3}, defined as β\left(θ\right)=\left(sinθ,-cosθ, sinθ \right) $ **(c)**$ γ:\left(-2,1\right)\rightarrow R^{3}, defined as γ\left(t\right)=(\sqrt{t}, t^{2},t^{3}) $ |
| **Question II: Compute the arc length of the regular curve** $α\left(t\right)=\left(-2sinh3t,2cosh3t, 6t\right) for 0\leq t\leq 5.$ **Then parametrize it with its arc length function. Compute the arc length of the reparametrized form of** $α\left(t\right)$ **at the corresponding points. What do you conclude about the length of** $α$ **and the length of the reparmetrized form of** $α$**.****Question III: Given a unit speed curve** $α\left(s\right)=(\frac{1}{\sqrt{2}}sins,2+coss, \frac{1}{\sqrt{2}}sins )$1. **Find its Frenet-Serret apparatus.**

**(b)Find the equation of the rectifying plane to** $α\left(s\right) at s=0$**.****(c) Does the curve have a special geometric shape? What is it?****(d) Write the vector** $v=(1,0,1)$ **in terms of** $T,N$**, and** $B.$**Question IV: Define a general helix. Show that a unit speed curve**$ α\left(s\right) with k\ne 0$ **is a helix if and only if there is a constant** $c$ **such that** $τ=ck$**.**Good luck ☺ |
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