M311-HWK10.1-Hint

Sunday, April 11, 2021 4:49 PM

#23. $F = (2z^5 - 3xy)\,i - x^2\,j + x^2 z\,k$

$M \qquad N \qquad P$

Path $(1,1,3) \xrightarrow{l_1} (-1,1,3) \xrightarrow{l_2} (-1,-1,3) \xrightarrow{l_3} (1,-1,3) \xrightarrow{l_4} (1,1,3)$

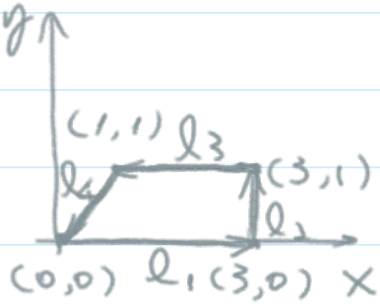
l_1: $x|_1^{-1}$, $y = 1, z = 3, dy = dz = 0$

l_2: $x = -1$, $y|_1^{-1}$, $z = 3$, $dx = dz = 0$

l_3: $x|_{-1}^{1}$, $y = -1$, $z = 3$, $dy = dz = 0$

l_4: $x = 1$, $y|_{-1}^{1}$, $z = 3$, $dx = dz = 0$

#25. Find $\int_C x^2 y\,dx - (x+y)\,dy$. C:



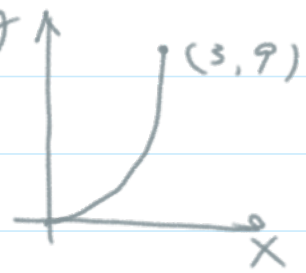
l_1: $x|_0^3$, $y = 0$, $dy = 0$

l_2: $x = 3$, $y|_0^1$, $dx = 0$

l_3: $x|_3^1$, $y = 1$, $dy = 0$

l_4: $x = y|_1^0$

#27. Evaluate $\int_C y\,dx - x\,dy$ C:



$x = t$, $y = t^2$, $t\,|\,{}^{3\to 0}_{0\to 3}$

$dx = dt$, $dy = 2t\,dt$

$I = \int_{0\to 3}^{3\to 0} (t^2 - t \cdot 2t)\,dt$.

#31. Evaluate $\int_C yz\,dx - xz\,dy + xy\,dz$

C: $(1, 1, 2) \to (5, 3, 1)$

Path: $\begin{bmatrix} x(t) \\ y(t) \\ z(t) \end{bmatrix} = \begin{bmatrix} 1 \\ 1 \\ 2 \end{bmatrix} + t\left(\begin{bmatrix} 5 \\ 3 \\ 1 \end{bmatrix} - \begin{bmatrix} 1 \\ 1 \\ 2 \end{bmatrix}\right) = \begin{bmatrix} 1+4t \\ 1+2t \\ 2-t \end{bmatrix}$, $0 \le t \le 1$

$dx = 4\,dt$, $dy = 2\,dt$, $dz = -dt$