# The 2D Lie Algebra

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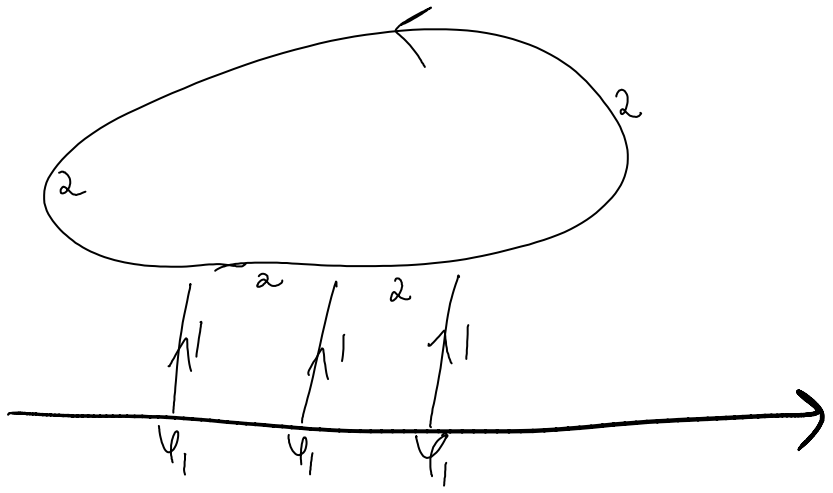
9:15 AM




$[x_1, x_2] = x_2$

$([x_1, \varphi_1])(x_1) = 0 \qquad ([x_1, \varphi_1])(x_2) := -\varphi_1([x_1, x_2]) =$

$-\varphi_1(x_2) = 0$

$\Rightarrow [x_1, \varphi_1] = 0$

Likewise, $[x_1, \varphi_2] = -\varphi_2$

$[x_2, \varphi_1] = 0$

$[x_2, \varphi_2] = \varphi_1$ :

$([x_2, \varphi_2])(x_1) = \varphi_2([x_1, x_2]) = \varphi_2(x_2) = 1$