Info

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$\mathfrak{so}(3,\mathbb{R})$-Poisson structure on $\mathbb{R}^3$

Definition. $\mathfrak{so}(3,\mathbb{R})$-Poisson structure on $\mathbb{R}^3$

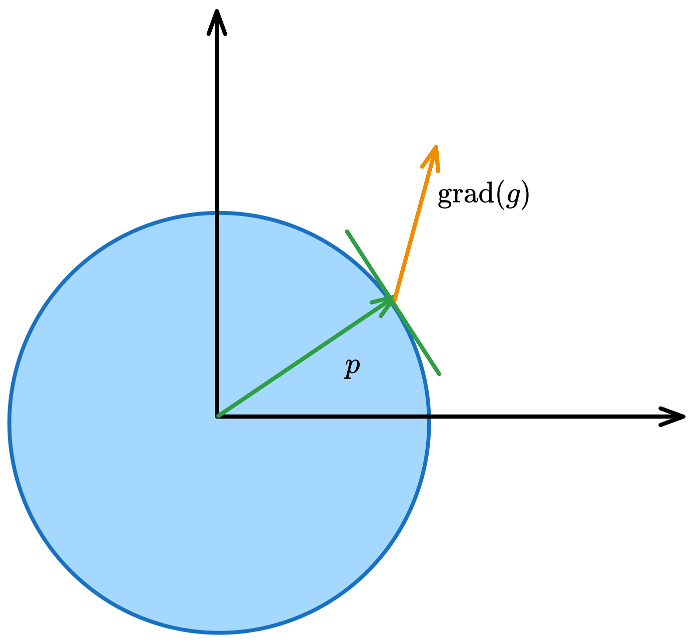
In Cartesian coordinates (x_1, x_2, x_3) on $\mathbb{R}^3$

$$\begin{aligned}\{f,g\}(x) &:= \begin{bmatrix}\frac{\partial f}{\partial x_1} & \frac{\partial f}{\partial x_2} & \frac{\partial f}{\partial x_3}\end{bmatrix}\begin{bmatrix}0 & -x_3 & x_2\\ x_3 & 0 & -x_1\\ -x_2 & x_1 & 0\end{bmatrix}\begin{bmatrix}\frac{\partial g}{\partial x_1}\\ \frac{\partial g}{\partial x_2}\\ \frac{\partial g}{\partial x_3}\end{bmatrix}\\ &= \operatorname{grad}(f)\cdot(x\times\operatorname{grad}(g))\end{aligned}$$

Hence, the Hamiltonian vector field

$$\{-,g\}(p) = p\times\operatorname{grad}(g)$$

chooses a perpendicular of the two vectors



And

$$C := x_1^2 + x_2^2 + x_3^2$$

is a Casimir function, $\{C,-\} = 0$.

Current note has 0 direct children and 0 total descendants.

- squishy
  - SO
    - $SO(3,\mathbb{R})$
      - $\mathfrak{so}(3,\mathbb{R})$-Poisson structure on $\mathbb{R}^3$

And it has 1 siblings.

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