Problem sheet #11

(42) [1 point]

We can view a (smooth) vector field A as a family of maps $A_U: \mathcal{C}^\infty(U) \to \mathcal{C}^\infty(U)$ ($U \overset{\text{open}}{\subset} X$) with certain properties. Please <u>give</u> these properties. □

(43) [1 point]

We can view a (smooth) dual field ω as a family of maps $\omega_U: \mathcal{J}(U) \to \mathcal{C}^\infty(U)$ ($U \overset{\text{open}}{\subset} X$) with certain properties. Please <u>give</u> these properties. $\mathcal{J}(U)$ denotes the vec. sp. of vector fields on U. □

(44) [2 points]

Please <u>give</u> the definition of the differential $dx^i = dx_i$ on $\mathbb{R}^n$.

Please <u>explain</u> how dx^i is "reacting" with a vector field $A = \sum_{j=1}^n A^j \frac{\partial}{\partial x^j}$

and <u>give</u> the result of this "reaction". □

(45) [1 point]

We can view a (smooth) vector field A as a family of maps $A_U: \mathcal{J}^*(U) \to \mathcal{C}^\infty(U)$ ($U \overset{\text{open}}{\subset} X$) with certain properties. Please <u>give</u> these properties. $\mathcal{J}^*(U)$ denotes the vec. sp. of differentials on U. □

(46) [1 point]

Please <u>give</u> the "reaction" of $\frac{\partial}{\partial x^i}$ and a differential $\sum_{j=1}^n \omega_j dx^j$. □

(47) [1 point]

We can view a (smooth) tensor field A as a family of maps $A_U: \mathcal{J}^*(U) \times \ldots \times \mathcal{J}^*(U) \times \mathcal{J}(U) \times \ldots \times \mathcal{J}(U) \longrightarrow \mathcal{C}^\infty(U)$ with certain properties. Please <u>give</u> these properties.