Exercises for Lecture #2

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1. Find a geometric description of the canonical 1-form $\sigma = \xi \cdot dx = \sum_{j=1}^{n} \xi_j dx_j$ which shows that it is independent of the choice of local coordinates. (Since $\omega = d\sigma$, this shows that ω is also coordinate independent.)

2. If Y is the image of a smooth curve $\gamma(t) = (t, g(t), h(t))$ in $\mathbb{R}^3$, find N^*Y and a phase function parametrizing it.

3. In today's lecture notes (but not covered on Zoom due to the time constraint), the phase functions of the examples of FIOs T_1, T_3, T_5 are verified as nondegenerate and the corresponding Lagrangians they parametrize are found. Do the same for T_2, T_4, T_6. (T_6 does depend on an unknown function.)