

## Suggested exercises for Problem Solving Session 4

MAT 4551 Spring 2019

HW  $x$  = Homework number  $x$  in the book by Cannas da Silva.

- HW 7, Problems 1-4.
- With the notation as in HW 7, prove that if  $N \subset X$  is a submanifold, then

$$L_N = \{u \in \mathbb{P}^*X; u(v) = 0 \text{ for all } v \in TN\}$$

is a Legendrian submanifold of  $(\mathbb{P}^*X, \mathbb{H})$ .

- Show that any Stein manifold admits the structure of a Weinstein manifold.
- Let  $(S(M), d(e^t\alpha))$  be the symplectization of a contact manifold  $(M, \xi = \ker \alpha)$  with Liouville vector field  $X = \partial_t$ . Prove that the Hamiltonian vector field of a function  $H: S(M) \rightarrow \mathbb{R}$  on  $S(M)$  satisfying  $\mathcal{L}_X H = H$  lifts a contact vector field on  $(M, \xi = \ker \alpha)$ .