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Symplectic Geometry

Homework 2

Exercise 1. (10 points)
Exercise 8 from Homework 1 (on page 8) in *Lectures on Symplectic Geometry* by A. Cannas da Silva. Also available online at: http://www.mi.uni-koeln.de/∼pabiniak/sg.html

Exercise 2. (10 points)
Show that for any linear subspaces V_1, V_2 of a symplectic vector space (V, ω) it holds that

$$(V_1 + V_2)^\omega = V_1^\omega \cap V_2^\omega, \qquad (V_1 \cap V_2)^\omega = V_1^\omega + V_2^\omega.$$

Exercise 3. (10 points)
Show that any hyperplane W in a $2n$ dimensional symplectic vector space (V, ω) is coisotropic.

Exercise 4. (10 points)
Let $E \subset V$ be a coisotropic subspace. Show that

$$\Gamma_E := \{(\pi(w), w) \in V_E \times \overline{V}\}$$

is a Lagrangian in $V_E \times \overline{V}$. For any Lagrangian L in V it holds that $\Gamma_E \circ L = L_E$, where $\Gamma_E \circ L$ is the composition of Lagrangians (see lecture).

Hand in: Thursday November 3rd
in the exercise session
in Übungsraum 1, MI