

# Contact Geometry

## Exercise sheet 6

**Exercise 1.**

Describe the characteristic foliations of

- (a) the sphere of radius  $r$  in  $(\mathbb{R}^3, \xi_{st})$ ,
- (b) the sphere of radius  $r$  in  $(\mathbb{R}^3, \xi_{ot})$ , and
- (c) the boundary of a standard tubular neighborhood of a transverse knot.

**Exercise 2.**

We consider on  $T^2 \times \mathbb{R}$  the contact forms

$$\begin{aligned}\alpha_0 &= \cos(z)dx + \sin(z)dy, \\ \alpha_1 &= dx + zdy.\end{aligned}$$

Show that  $T^2 \times 0$  admits a neighborhood on which the induced contact structures are contactomorphic.

**Exercise 3.**

The two Chekanov knots have the same classical invariants and get isotopic after a single stabilization.

**Exercise 4.**

- (a) Express the self-linking number of the transverse push-off  $L_{\pm}$  of a Legendrian knot  $K$  in terms of the classical invariants of  $L$ .
- (b) Reformulate the Bennequin bound in terms of transverse knots.

**Exercise 5.**

Prove Theorem 4.3 from the lecture.