Christian-Albrechts-Universität zu Kiel **Winter term 2015/16**
Mathematisches Seminar
Prof. Dr. M. Vetter, O. Martin/A. Theopold

In-tutorial exercise sheet 7

supporting the lecture Mathematical Statistics

(Discussion in the tutorial on 16. December 2015)

Exercise 1.

Use the criterion which you are asked to prove in exercise 3 on sheet 7 to show the minimal sufficiency of statistics:

a) Let $X_1, \ldots, X_n$ i.i.d Cauchy distributed with unknown location parameter $\vartheta \in \mathbb{R}$ i.e.

$$X_i \sim f_\vartheta, \quad f_\vartheta(x) = \frac{1}{\pi\left(1 + (x-\vartheta)^2\right)}, x \in \mathbb{R}.$$

Show that the order statistic $X_{(\cdot)}$ is minimal sufficient for ϑ.

b) Prove again theorem 4.22 from the lecture notes i.e. the statistic T is minimal sufficient for exponential families.