Assignments for the lecture

*Introduction to Noncommutative Differential Geometry*

Summer term 2019

**Assignment 2A**

for the tutorial on Tuesday, May 7, 10:15 am (in Seminar Room 10)

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**Exercise 1.**

(i) Let $E$ be an $n$-dimensional (real or complex) vector bundle over a Hausdorff topological space $X$.

Construct an $n$-dimensional (real or complex) vector bundle $E^*$ over $X$, such that for each $x \in X$ the fibre $E_x^*$ of $E^*$ is the dual space of the fibre $E_x$ of $E$, i.e., $E_x^* = \text{hom}(E_x, \mathbb{K})$.

We call $E^*$ the **dual bundle of $E$**.

(ii) Let $E$ be an $n$-dimensional smooth (real or complex) vector bundle over a smooth manifold $\mathcal{M}$. Show that the dual bundle $E^*$ of $E$ is also smooth.