

Tensor Analysis and Applications 2019

## Exercise 3

Due 25/4/2019

- 1.) Derive the transformation law for a normal co-vector using the results from the lecture and the Riesz representation theorem (reminder:  $\langle n, t \rangle = 0$ ).
- 2.) Let  $f : V \rightarrow W$  be a linear map between the vector spaces  $V$  and  $W$ . Derive the coordinate representation for the dual map  $f^* : W^* \rightarrow V^*$  induced by  $f$ ,

$$\beta(fu) = u(f^*\beta).$$