

# Bases in Sobolev Spaces on $[0, 1]^d$

Bachelor thesis topic

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We denote by  $I = [0, 1]$  the unit interval. The aim of this Bachelor's thesis is to provide a collection of bases (orthonormal bases, Schauder bases, etc.) of spaces  $W^{p,k}(I^d)$  which have a tensor product structure, i.e. where the elements are of the form

$$f_k = f_{1,k} \otimes \cdots \otimes f_{d,k}.$$

An  $L^2$ -orthonormal basis of  $W^{m,p}(I^d)$  with this property which is also a basis of  $C^m(I^d)$  has been constructed by Z. Ciesielski and J. Domsta in [2].

## References

- [1] Fernando Albiac and Nigel J. Kalton. *Topics in Banach space theory*, volume 233 of *Graduate Texts in Mathematics*. Springer, New York, 2006.
- [2] Z. Ciesielski and J. Domsta. Construction of an orthonormal basis in  $C^m(I^d)$  and  $W_p^m(I^d)$ . *Studia Math.*, 41:211–224, 1972.