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ABSTRACTS

**LATVIJAS MATEMĀTIKAS BIEDRĪBA
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LATVIJAS UNIVERSITĀTE**

ON SMOOTHING SPLINES WITH WEIGHTS UNDER ADDITIONAL CONDITIONS ¹

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The talk deals with the smoothing problem with weights under additional restrictions in the abstract setting of a Hilbert space. Let X, Y be Hilbert spaces and assume that linear operators $T : X \rightarrow Y$ and $A : X \rightarrow \mathbb{R}^n$ are continuous. For given parameters $\omega_i > 0$, $i = 1, \dots, n$, matrix $\Omega = \text{diag}(\omega_i)_{i=1, \dots, n}$ and vector $v \in \mathbb{R}^n$ we consider the conditional minimization problem:

$$\|Tx\|^2 + \|\Omega^{-1}(Ax - v)\|^2 \rightarrow \min_{x \in H},$$

where H is a convex closed subset of X . In case $H = X$ a solution of this problem is a spline called the smoothing spline with weights.

In particular, H could be defined by restrictions given by a linear continuous operator $B : X \rightarrow \mathbb{R}^m$. We consider the problem in such a general statement and investigate it in both cases, when all functionals of A and B are linear independent and when these functionals are dependent. This study is closely related to our previous works [1], [2].

REFERENCES

- [1] S. Asmuss, N. Budkina. Splines in convex sets under constraints of two-sided inequality type in a hiperplane. *Mathematical Modelling and Analysis*, **13** (4):461–470, 2008.
- [2] S. Asmuss, N. Budkina. On smoothing problems with one additional equality condition. *Mathematical Modelling and Analysis*, **14** (2):159–168, 2009.

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