Abstracts of MMA2013 & AMOE2013, May 27–30, 2013, Tartu, Estonia

GENERALIZED SMOOTHING SPLINES IN CONVEX SETS [1]

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The talk deals with the following conditional minimization problem

$$||Tx||^2 + ||R(Ax-v)||^2 \longrightarrow \min_{x \in B^{-1}(C)}$$

for linear continuous operators $T : X \to Y$, $A : X \to I\!R^n$ and $B : X \to I\!R^m$ in Hilbert spaces X and Y, given diagonal matrix $R = diag(\sqrt{\rho_i})_{i=1,\dots,n}$ with parameters $\rho_i \geq 0$, $i = 1, \dots, n$, closed convex set $C \subset I\!R^m$ and vector $v \in I\!R^n$. This problem generalizes the smoothing problem with weights and the problem on splines in convex sets (see e.g. [1]).

We investigate the existence and obtain a characterization of solutions of this problem in dependence on whether all functionals of operators A and B are linear independent or not. In particular, we consider the cases:

1) $A = MB$,
2) $B = MA$,
3) $A_1 = MB_1$,
4) $B_1 = MA_1$,

where M is a matrix with the corresponding size, $A = (A_1, A_2)$ and $B = (B_1, B_2)$.

Special results are proved for $C = \Pi_{i=1}^m [a_i, b_i] \subset I\!R^m$, not excluding the case when $a_i = b_i$ for some i, which corresponds to interpolating conditions.

This study is closely related to our previous works [2], [3].

REFERENCES

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[1] **Acknowledgement** This work was partially supported by the project 2009/0223/1DP/1.1.1.2.0/09/APIA/VIAA/008 of the European Social Fund.