TITLE

AUTHORS

Abstract. Abstract

Key words. key words

AMS subject classifications. AMS ref numbers

1. Introduction.

1.1. Contributions.

1.2. Previous studies / State-of-the-art.

1.3. Organization of the paper.

1.4. Notation.

2. .

3. .

$$
\begin{aligned}
&\min_{\beta,\tau} \quad \frac{1}{2}\sum_{n=1}^{N}\left(F_n(\boldsymbol{\beta})\boldsymbol{\tau} - \tilde{w}_n\right)^2 + \frac{1}{2}\lambda_\alpha \left\|\boldsymbol{\tau}\right\|_2^2 + \lambda_\beta \mathcal{R}(\boldsymbol{\beta}) \\
&\text{s.t.} \quad \boldsymbol{\tau} \in \mathbb{R}_+^M,\ \boldsymbol{\beta} \in]0,1[^M
\end{aligned} \tag{3.1}
$$

where $\mathcal{R}$ is a regularization that is proper, convex and lower-semicontinuous. For instance, $\mathcal{R}$ can be the total variation $\mathcal{R}(\mathbf{x}) = \|\mathbf{D}\mathbf{x}\|_1$ with $\mathbf{D}$ the discrete gradient matrix defined as the idendity matrix with coefficients -1 on its subdiagonal.

Equation (3.1) has the typical form of a constrained variable projection problem [1]. Indeed, it can be formulated as

$$
\begin{aligned}
&\min_{\beta,\tau} \quad \frac{1}{2}\left\| \begin{pmatrix} \mathbf{F}(\boldsymbol{\beta}) \\ \sqrt{\lambda_\alpha}\,\mathrm{Id} \end{pmatrix} \boldsymbol{\tau} - \begin{pmatrix} \tilde{\mathbf{w}} \\ \mathbf{0} \end{pmatrix} \right\|_2^2 + \lambda_\beta \mathcal{R}(\boldsymbol{\beta}) \\
&\text{s.t.} \quad \boldsymbol{\tau} \in \mathbb{R}_+^M,\ \boldsymbol{\beta} \in]0,1[^M
\end{aligned} \tag{3.2}
$$

4. .

5. Conclusion.

Conclusion

Appendix A. Proof of blablabla.

REFERENCES

[1] G. Golub and V. Pereyra, *Separable nonlinear least squares: the variable projection method and its applications*, Inverse Problems, 19 (2003), pp. R1–R26, https://doi.org/10.1088/0266-5611/19/2/201.