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ON AN ALGORITHM OF HISTOPOLATION UNDER INEXACT INFORMATION

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We consider the problem of approximation of histogram $F = \{f_1, \ldots, f_n\}$ given on a mesh $\triangle_n \colon a = t_0 < t_1 < \ldots < t_n = b$ by a function g from Sobolev space $\mathbf{W}_2^r[a,b]$ under inequality constraints for area matching conditions

$$\int_a^b (g^{(r)}(t))^2\,dt \longrightarrow \min_{\left|\int_{t_{i-1}}^{t_i} g(t)dt - f_i h_i\right| \le \varepsilon_i,\ \ \varepsilon_i \ge 0,\ \ i=1,\ldots,n}, \tag{1}$$

where $h_i = t_i - t_{i-1}$, $i = 1, \ldots, n$.

In the case of exact information (i.e. $\varepsilon_i = 0$, $i = 1, \ldots, n$) a solution of this problem is a spline s of one variable of degree $2r$ and defect 1 which satisfies the conditions:

- s is a polynomial of degree $2r$ on each interval (t_{i-1}, t_i), $i = 1, \ldots, n$;
- $s \in \mathbf{C}^{2r-1}[a,b]$;
- $s^{(q)}(a) = s^{(q)}(b) = 0$, $q = r, \ldots, 2r-1$;
- $\int_{t_{i-1}}^{t_i} s(t)\,dt = f_i h_i$, $i = 1, \ldots, n$.

This spline is called by histosplines.

The problem (1) is considered in the case of inexact information (i.e. $\varepsilon_i > 0$, for some i). Its solution is a smoothing histospline.

Under the conditions of existence and uniqueness of the solution of the smoothing problem (1) the method for its construction is suggested and investigated in [1].

REFERENCES

[1] N. Budkina. On a method of construction of smoothing histosplines. *Proc. Estonian Acad. Sci. Phys. Math.*, to appear.