REMARK TO THE REGULARITY OF FUNCTIONS SATISFYING A MULTIPLICATIVE FUNCTIONAL EQUATION ALMOST EVERYWHERE

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An example where we can apply our method in [3] and the methods in my talk (because the key observations remain true) to prove that if the functional equation is satisfied almost everywhere and on one side non of the unknown real-valued functions is almost everywhere zero then all are almost everywhere nonzero and they are almost equal to $\mathcal{C}^\infty$-functions satisfying the equation everywhere is the functional equation

$$f_1(x_1)f_2(x_2)f_3(x_3) = g_1(y_1)g_2(y_2)g_3(y_3),$$

$0 < x_1, x_2, x_3 < 1$, where

$$y_1 = x_2 + (1 - x_1)(1 - x_2)x_3,$$

$$y_2 = \frac{x_1 x_2}{x_2 + (1 - x_1)(1 - x_2)x_3}$$

and

$$y_3 = \frac{x_1 x_3}{\big(1 - (1 - x_1)x_3\big)\big(x_2 + x_3 - x_2 x_3\big)}.$$

The Baire category case can be treated, too. About this equation see [1] of Bobecka and Wesolowski.

References

1. Konstancja Bobecka, Jacek Wesolowski, *Kshirsagar–Tan independence property of beta matrices and related characterizations*, Bernoulli **14** (2008), 749–763.
2. Antal Járai, *Regularity Properties of Functional Equations in Several Variables*, Springer, New York, 2005.
3. Antal Járai, *Regularity properties of measurable functions satisfying a multiplicative type functional equation almost everywhere* (to appear).
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5. Fruzsina Mészáros, Károly Lajkó, *Functional equations and characterization problems*, WDM Verlag, 2011.

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