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Corrigendum to: Fibers of the L^∞ algebra and disintegration of measures

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The paper [2] contains a study of the fiberwise structure of the spectrum of the algebra $L^\infty(\mu)$ for some Borel measure μ on a compact topological space X. Its two main results deal with the fiberwise constancy of Gelfand transforms $\widehat{[f]}$ of elements $[f] \in L^\infty(\mu)$. The first one (Theorem 2.7) asserts such a constancy on each fiber intersected with some open dense set U, depending on f. To get rid of such an unconvenience, the second result (Theorem 4.2) uses the constancy almost everywhere on almost every fiber. The "almost everywhere" condition related to the measures on the fibers, resulting from the disintegration of the measure $\widetilde{\mu}$ on the spectrum of $L^\infty(\mu)$ corresponding to μ.

Unfortunately, the disintegration claim of Theorem 3.3 used in this purpose was incorrect. The problem relies on the incorrect definition of the functionals Φ_z given by the formula (3.4). Indeed, in some cases, the family $\mathcal{U}_z$ is not directed by the inclusion, therefore the limit operation in (3.4) does not make sense. The main obstacle is the possible non-separability of the compact space and the fact that on such spaces there may exist measures failing to possess the so called "strong lifting property" [4], which is equivalent to the failure of the disintegration with respect to some mappings [1]. This means that Theorem 3.3 cannot hold in such cases, a fact kindly communicated by Prof. Zbigniew Lipecki [3].

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On the other hand, our Theorem 4.2 remains true. Indeed, despite of being highly nonseparable, the Gelfand spectrum Y of the algebra $L^\infty(\mu)$ is a hyperstonean space. The latter is equivalent to the fact that the algebra $C(Y)$ is a dual of the Banach space $L^1(\mu)$. For such compact spaces, the disintegration of any Borel measure is possible since the strong liftings here do exist [1,5], and this applies to our measure $\widetilde{\mu}$.

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