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MAXIMAL IDEAL SPACE OF SOME BANACH ALGEBRAS AND RELATED PROBLEMS

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ABSTRACT. Let $C_A^{(n)} := C_A^{(n)}(\mathbb{D} \times \mathbb{D})$ denote the subspace of functions in the Banach space $C^{(n)}(\mathbb{D} \times \mathbb{D})$ which are analytic in the bi-disc $\mathbb{D} \times \mathbb{D}$. We consider the subspace B_{zw} consisting from the functions $f \in C_A^{(n)}$ which can be represented in the form $f(z, w) = g(zw)$, where g is a single variable function from the disc algebra $C_A(\mathbb{D})$. We prove that B_{zw} is a Banach algebra under the Duhamel multiplication

$$(f \circledast g)(zw) = \frac{\partial^2}{\partial z \partial w} \int_0^z \int_0^w f((z-u)(w-v)) g(uv) dv du$$

and describe its maximal ideal space. We also consider the Hardy type operator $f \rightarrow xy \int_0^x \int_0^y f(t\tau) d\tau dt$ and discuss its some properties.

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