A pair of monads

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In the article [3], H. Simmons describes two monads arising from the dual adjunction between the category of topological spaces with continuous functions and (bounded) distributive lattices with homomorphisms. These are the open prime filter monad and the ideal lattice monad. He then proceeds to describe their respective algebras: the category **StKSp** of stably compact spaces with proper maps and the category **Frm** of frames with frame maps.

We show that an iteration of the ideal lattice monad on **Frm** leads to the ideal lattice *comonad* on the latter, and that this comonad is related to the open prime filter monad. We use this to give a new proof of the equivalence between **StKSp** and the category of stably compact frames. We also show that further iterations of the ideal monad do not strictly lead to a new category by expanding on B. Jacobs' results on lax idempotent monads in [2]. This, together with the Fakir construction ([1]), will allow us to give a new and generalised proof of the dual equivalence between the category of coherent frames and that of distributive lattices.

References

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