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Frobenius and Hopf $\mathcal{V}$-categories

We define *Frobenius $\mathcal{V}$-categories*, for any monoidal category $\mathcal{V}$. We also recall basic notions of Hopf $\mathcal{V}$-categories as introduced in [1]. When $\mathcal{V}$ is the category of modules over a commutative ring, we show that the classical Larson-Sweedler theorem can be generalised to this many-object setting by giving equivalent definitions of Frobenius k-linear categories in terms of Casimir elements and self-duality in the same style as ordinary Frobenius algebras.

References:

[1] E. Batista, S. Caenepeel, J. Vercruysse, "Hopf categories", Algebras Repres. Theory 19 (2016), 1173–1216.

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