From Derivation on Module Theory to Co-derivation on Comodule Theory

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Let (C, Δ, ε) be an R-algebra and M a left C-comodule. This research motivated by derivations on ring and module theory. We introduce co-derivation concept on coalgebra and comodule. By using the dualization concept from multiplication to comultiplication and action to coaction. We define some axioms for a linear map of coalgebra and comodule to become a co-derivation. We also see that a derivation of rings can be considering as a trivial co-derivation of coalgebra and a derivation of modules is a trivial co-derivation of comodule. However, by some steps and using an example we can prove that a ring derivation is not need to be a coalgebra co-derivation. We conclude that the comultiplication of coalgebras and coaction of comodules are important to ensure that a linear map from C to C and M to M be a co-derivation.

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