# On the modules having proper $S$-essential submodules

Samruam Baupradist* and Poramate sangchan

Chulalongkorn University
E-mail: samruam.b@chula.ac.th

In this talk, we study $S$-essential submodules which are a generalization of essential submodule of modules. Besides giving many examples and properties of $S$-essential submodules, we generalize some results on essential submodules to $S$-essential submodules. Finally, we can show that for a nonzero right $R$-module $M$ such that $Ann_R(m) \cap S = \varnothing$ for all $m \in M - \{0\}$, $M$ has a proper $S$-essential submodule if and only if a right $R/Ann_R(M)$-module $M$ has a proper $\overline{S}$-essential submodule where $\overline{S} = \{s + Ann_R(M) | s \in S\}$.

## References

[1] E. Yildiz, Ü. Tekir and S. Koç, On $S$-comultiplication modules, *Turkish J. Math.*, Vol.45, pp.1-13, 2021.

[2] F. Kasch, Modules and Rings, Stuttgart, 1977.

[3] M. D. Cisse and D. Sow, On Generalizations of Essential and Small Submodules, *Southeast Asian Bulletin of Mathematics*, vol.41, pp. 369–383, 2017.

[4] Y. A. Qasim and S. M.Yaseen, Annihilator Essential Submodules, *Iraqi Academics Syndicate International Conference for Pure and Applied Sciences, Journal of Physics: Conference Series.* 1818, 012213, 2021.

[5] H. A. Shahad and N. S. Al-Mothafar, On P-Essential Submodules, *Iraqi Journal of Science*, vol.62, no.12, pp.4916-4922, 2021.

[6] H. A. Shahad and N. S. Al-Mothafar, On essential-prime sub-modules, *Journal of Discrete Mathematical Sciences and Cryptography*, vol.24, no.7, pp.1973-1977, 2021.

[7] S. Rajaee, $S$-Small and $S$-Essential submodules, *Journal of Algebra and Related Topics*, vol.10, no.1, pp.1-10, 2022.

[8] D. D. Anderson, T. Arabaci, Ü. Tekir and S. Koç, On $S$-multiplication modules, *Comm. Algebra*, vol.48, no.8, pp.3398-3407, 2020.

[9] Z. A. El-Bast and P. F. Smith, Multiplication Modules, *Communication in Algebra*, vol.16, no.4, pp.755-779, 1988.

[10] H. Zhu and X. Xu, On Radical-injective modules, *International Journal of Pure and Applied Mathematics*, vol.41, no.6, pp.793-796, 2007.