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On the Arens regularity of a module action and its extensions. (English) Zbl 1474.46093
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Summary: It is known that if the second dual \mathcal{A}^{**} of a Banach algebra \mathcal{A} is Arens regular, then \mathcal{A} is Arens regular itself. However, the converse is not true, in general. *N. J. Young* [Proc. Edinb. Math. Soc., II. Ser. 20, 99–120 (1976; [Zbl 0331.46042](#))] gave an example of an Arens regular Banach algebra whose second dual is not Arens regular. Later, *J. Pym* [J. Niger. Math. Soc. 2, 31–33 (1983; [Zbl 0572.46044](#))] has polished Young's example for presenting more applicable examples. In this paper, we mimic the methods of Young and Pym to present examples of some Arens regular bilinear maps and module actions whose some extensions are not Arens regular. Finally, some relationships between the topological centers of certain Banach module actions are investigated.

MSC:

[46H20](#) Structure, classification of topological algebras

[46H25](#) Normed modules and Banach modules, topological modules (if not placed in 13-XX or 16-XX)

Keywords:

bilinear map; Banach algebra; module action; Arens regular

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