

Final Report on 2010–11 Research Grant

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In the academic year 2009–10, I received a 2010–11 Research Grant of \$3500 (summer stipend) for the project “Symmetries Associated with Free G -Sets.” The goal of the project was to determine the elements and structure of the groups of symmetries associated with mathematical objects called free G -sets. The outcome of my work is a research article (24 pages long), *Automorphism Groups of Endomorphism Monoids of Free G -sets* (enclosed). The results I have obtained are as follows:

- (1) For an arbitrary free G -set A , I have determined the group $\text{Aut}(A)$ of symmetries (automorphisms) of A (Theorem 3.10, page 5 of the attached article).
- (2) For an arbitrary free G -set A , I have determined the group $\text{Aut}(\text{End}(A))$ of symmetries of the monoid $\text{End}(A)$ of endomorphisms of A (Theorem 6.7, page 15).
- (3) I have introduced the new concept of the *double semidirect product* of groups (Definition 7.4, page 19) and used this notion to characterize certain maximal subgroups of $\text{Aut}(\text{End}(A))$ (Theorem 7.10, page 21).

The results listed in (1) and (2) realize the specific objectives enumerated on page 2 of the project proposal. The new concept and theorem listed in (3) are additional results, which enhance the article.

I intend to submit the article for publication in a refereed journal. When the article is published, it will be reviewed in the Mathematical Reviews and accessible to all mathematicians interested in the subject. I am also planning to give talks on my research at professional meetings and conferences.