Normal ordering associated with $\lambda$-Stirling numbers in $\lambda$-shift algebra.

Summary: It is known that the Stirling numbers of the second kind are related to normal ordering in the Weyl algebra, while the unsigned Stirling numbers of the first kind are related to normal ordering in the shift algebra. Recently, Kim-Kim introduced a $\lambda$-analogue of the unsigned Stirling numbers of the first kind and that of the r-Stirling numbers of the first kind. In this article, we introduce a $\lambda$-analogue of the shift algebra (called $\lambda$-shift algebra) and investigate normal ordering in the $\lambda$-shift algebra. From the normal ordering in the $\lambda$-shift algebra, we derive some identities about the $\lambda$-analogue of the unsigned Stirling numbers of the first kind.

MSC:
11B73 Bell and Stirling numbers
11B83 Special sequences and polynomials

Keywords:
$\lambda$-shift algebra; normal ordering; unsigned $\lambda$-Stirling numbers of the first kind; $\lambda$-r-Stirling numbers of the first kind

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