Abstract

We introduce an affine Schur algebra via the affine Hecke algebra associated to Weyl group of affine type C. We establish multiplication formulas on the affine Hecke algebra and affine Schur algebra. Then we construct monomial bases and canonical bases for the affine Schur algebra. The multiplication formula allows us to establish a stabilization property of the family of affine Schur algebras that leads to the modified version of an algebra $\mathbf{K}_n^{\mathfrak{c}}$. We show that $\mathbf{K}_n^{\mathfrak{c}}$ is a coideal subalgebra of quantum affine algebra $\mathbf{U}(\widehat{\mathfrak{gl}}_n)$, and $\big(\mathbf{U}(\widehat{\mathfrak{gl}}_n), \mathbf{K}_n^{\mathfrak{c}}\big)$ forms a quantum symmetric pair. The modified coideal subalgebra is shown to admit monomial and stably canonical bases. We also formulate several variants of the affine Schur algebra and the (modified) coideal subalgebra above, as well as their monomial and canonical bases. This work provides a new and algebraic approach which complements and sheds new light on our previous geometric approach on the subject. In the appendix by four of the authors, new length formulas for the Weyl groups of affine classical types are obtained in a symmetrized fashion.