GENERALIZED AKS SCHEME OF INTEGRABILITY VIA VERTEX ALGEBRA

WENDA FANG

Abstract. There is a well-known way to construct integrable systems via Lie algebra called the Adler-Kostant-Symes (AKS) scheme. Let $\mathfrak{g}$ be a Lie algebra with an invariant, non-degenerate bilinear form $\langle\ ,\ \rangle$. Let R be a classical R-matrix of $\mathfrak{g}$, this gives a modified Lie algebra $\mathfrak{g}_R$. Consider the Kirillov-Kostant Poisson structures on the $\mathfrak{g}^*$ and $\mathfrak{g}_R^*$ and denote Poisson brackets on $\mathfrak{g}^*$ and $\mathfrak{g}_R^*$ by $\{\ ,\ \}$ and $\{\ ,\ \}_R$, respectively. Then all functions in the Poisson center with respect to $\{\ ,\ \}$ are commute with respect to $\{\ ,\ \}_R$. In this talk, we define the classical R-matrix for the vertex Lie algebras. We will see that a sufficient condition for an operator on a vertex Lie algebra to be a classical R-matrix is the modified Yang-Baxter equation (mYBE) of vertex Lie algebra which is an analog of the mYBE of Lie algebra. By using this R-matrix of vertex Lie algebra, we give a new scheme of integrability.