Kohji Yanagawa* (yanagawa@kansai-u.ac.jp). When is a Specht ideal Cohen-Macaulay? Preliminary report.

Let $R = K[x_1, \ldots, x_n]$ be a polynomial ring over a field $K$ of characteristic 0, and $\lambda$ a partition of $n$. For a Young tableau $T$ with shape $\lambda$, we have its Specht polynomial $f_T(x) \in R$. The symmetric group $S_n$ acts on the $K$-vector space $U_\lambda$ spanned by $\{ f_T(x) \mid T$ is a Young tableau with shape $\lambda \}$. An $S_n$-module $U_\lambda$ is called a Specht module, and $U_\lambda$'s give a complete list of irreducible representations of $S_n$.

So let us consider the ideal $I^{Sp}_\lambda := (U_\lambda) \subset R$. If $R/I^{Sp}_\lambda$ is CM, then $\lambda$ is of the form either $(a, 1, \ldots, 1)$, $(a, b)$, or $(a, a, 1)$. First, $R/I^{Sp}_{(a, 1, \ldots, 1)}$ can be seen as a determinantal ring, and is CM (a joint work with Junzo Watanabe). If $\lambda = (a, b)$ or $(a, a, 1)$, then we have

$$\sqrt{I^{Sp}_\lambda} = \bigcap_{F \subset \{1, \ldots, n\}, \#F = a+1} (x_i - x_j \mid i, j \in F).$$

A result of Etingof et al. states that $R/\sqrt{I^{Sp}_\lambda}$ is CM in these cases. Our main result is the following.

**Theorem.** $R/I^{Sp}_{(a, b)}$ is reduced, and hence CM.

The case $\lambda = (a, a, 1), a \geq 5$ is open. (Received January 19, 2019)