

1164-13-218

**Hang Huang\***, hhuang235@math.tamu.edu. *Syzygies of determinantal thickenings and  $gl(m-n)$  representations.*

The coordinate ring  $S = \mathbb{C}[x_{i,j}]$  of space of  $m \times n$  matrices carries an action of the group  $GL_m \times GL_n$  via row and column operations on the matrix entries. If we consider any  $GL_m \times GL_n$ -invariant ideal  $I$  in  $S$ , the syzygy modules  $\text{Tor}_i(I, \mathbb{C})$  will carry a natural action of  $GL_m \times GL_n$ . Via BGG correspondence, they also carry an action of  $\bigwedge^\bullet(\mathbb{C}^m \otimes \mathbb{C}^n)$ . It is a result by Raicu and Weyman that we can combine these actions together and make them modules over the general linear Lie superalgebra  $\mathfrak{gl}(m|n)$ . We will explain how this works and how it enables us to compute all Betti numbers of any  $GL_m \times GL_n$ -invariant ideal  $I$ . The latter part will involve combinatorics of Dyck paths. (Received January 19, 2021)