1117-17-513   **Jordan Alexander** (jordan.alexander@tamucc.edu) and **Markus Hunziker***
(markus_hunziker@baylor.edu). *Modules of covariants and category $\mathcal{O}$.* Preliminary report.

We show how to solve some famous problems (old and new) from classical invariant theory by using the structure of certain categories of highest weight modules. For example, we will use the structure of a category of highest weight modules for the symplectic Lie algebra $\mathfrak{sp}_{2n}(\mathbb{C})$ to compute the homological dimension of the modules of covariants for the action of the orthogonal group $O_k(\mathbb{C})$ on $\mathbb{C}^k \oplus \cdots \oplus \mathbb{C}^k$ (n-copies) which leads to a simple explicit characterization of the Cohen–Macaulay modules of covariants. (Received January 19, 2016)