1135-22-171 **Anna Macquarie Romanov*** (romanova@math.utah.edu). *A Kazhdan-Lusztig algorithm for Whittaker modules.*

Let $\mathfrak{g}$ be a complex semisimple Lie algebra, $\mathcal{U}(\mathfrak{g})$ its universal enveloping algebra, and $\mathfrak{z}(\mathfrak{g})$ the center of $\mathcal{U}(\mathfrak{g})$. Let $\mathfrak{b}$ be a fixed Borel subalgebra and $[\mathfrak{b}, \mathfrak{b}] = \mathfrak{n}$. This work concerns the category of Whittaker modules, which are finitely generated, $\mathcal{U}(\mathfrak{n})$-finite, and $\mathfrak{z}(\mathfrak{g})$-finite $\mathfrak{g}$-modules. This category is a natural extension of the category of highest weight modules, and its structure theory is analogous: simple modules occur as unique irreducible quotients of certain standard modules. This gives rise to natural questions about the multiplicities of simple modules in the composition series of standard modules. One way to approach these multiplicity questions is to use the localization theory of Beilinson-Bernstein to realize Whittaker modules as a particular class of $\mathcal{D}$-modules on the flag variety X of $\mathfrak{g}$. Using this approach, we develop a geometric algorithm for computing these multiplicities which generalizes Beilinson and Bernstein's algorithm for computing the composition series of Verma modules using Kazhdan-Lusztig polynomials. (Received August 07, 2017)