1137-49-215 **Julia Eaton*** (jreaton@uw.edu), 1900 Commerce Street, Box 358436, Tacoma, WA 98402, and **Mert Gurbuzbalaban**, **Sara Grundel** and **Michael Overton**. *Optimizing the polynomial radius and abscissa subject to affine constraints.*

Polynomial root optimization problems arise in the control of continuous and discrete time dynamical systems. The polynomial abscissa (the largest real part of an root of a polynomial) and the polynomial radius (the largest root in modulus) are examples of functions of polynomial root functions connected to such problems. A polynomial is Schur stable if its roots lie in the unit disk and it is Hurwitz stable if its roots lie in the left-half plane. We consider optimizing the polynomial radius and abscissa subject to affine constraints on the coefficients. For the radius, we recover a 2012 result of root activity when there is only one constraint, and extend this result when there are multiple constraints. For the polynomial abscissa, we derive similar results when the optimal solution is attained. We derive information about the variational structure of set of Hurwitz stable polynomials in order to understand the case where the optimal value is not attained. (Received February 04, 2018)