1086-14-2158 **Danko Adrovic*** (adrovic@math.uic.edu), Department of Math., Stat., and Comp. Sci., 322 Science and Engineering Offices (M/C 249), 851 S. Morgan Street, Chicago, IL 60607-7045, and **Jan Verschelde** (jan@math.uic.edu), Department of Math., Stat., and Comp. Sci., 322 Science and Engineering Offices (M/C 249), 851 S. Morgan Street, Chicago, IL 60607-7045. *Puiseux Series Expansions for Algebraic Sets.*

We give a polyhedral method to develop Puiseux series expansions for algebraic sets. We begin the development of the Puiseux series expansion by computing cones of pretropisms. The cones of pretropisms are the common cones of normal vectors to the Newton polytopes, corresponding to the polynomials in the system, which defines the algebraic set. The cones of pretropisms lead to initial form systems, whose isolated solutions in $(\mathbb{C}^*)^n$ correspond to the leading coefficients in the Puiseux series expansion of the algebraic set. Furthermore, the pretropisms in the cone are identified as leading exponents in the Puiseux series and the dimension of the cone as the dimension the algebraic set. Cones of pretropisms, which lead to a Puiseux series, are called tropisms. Our polyhedral method takes advantage of symmetry, which reduces the computational time significantly and it allows us to gain additional insights into the nature of the algebraic sets that are being developed. For example, the application of our polyhedral method to the cyclic n-roots problem lead to the exact representation of the solutions sets for $n = m^2$, leading to a tropical perspective on the lemma of Backelin. (Received September 24, 2012)