1096-14-686 **Rostam Sabeti*** (rsabeti@olivetcollege.edu), Department of Mathematics, Olivet College, Olivet, MI 49076. *Scheme of cyclic-9; A numerical-symbolic approach.*

Let $A := \mathbb{C}[x_1, \cdots, c_9]$. In 2001, Jean-Charles Faugère determined the solution set of cyclic-9, by computer algebra methods and Gröbner basis computation. In this talk, to derive the exact form of defining polynomials of 6 prime ideals of dimension 2 in primary decomposition of cyclic-9 a new symbolic-numerical algorithm will be presented. For a typical ideal of cyclic-9 of dimension 2, i.e., $\mathfrak{p} = \langle x_1+\omega x_7, x_2+\omega x_8, x_3+\omega x_9, x_4+\bar{\omega} x_7, x_5+\bar{\omega} x_8, x_6+\bar{\omega} x_9, x_7x_8x_9+\omega\rangle$ ($\omega := \frac{1}{2}-\frac{\sqrt{3}i}{2}$), we present a proof of primality and the structure of its residue class field as

$$((A\backslash\mathfrak{p})/\mathfrak{p})^{-1}(A/\mathfrak{p}) = \left\{\frac{f}{g} : f, g \in \bigoplus_{i=7}^{9} x_i\mathbb{C}[x_i] \oplus \eta\mathbb{C}[x_7, x_8] \oplus \delta\mathbb{C}[x_8, x_9] \oplus \sigma\mathbb{C}[x_7, x_9] \oplus \mathbb{C}; g \neq 0\right\},$$

where $\eta := x_7x_8,\ \delta := x_8x_9,\ \sigma := x_7x_9$. (Received September 09, 2013)