1079-11-20 **Ricardo Conceicao*** (`rconcei@emory.edu`), Oxford College of Emory University, 100 Hamil st, Oxford, GA 30054, and **Herivelto Borges**, USP - Sao Carlos, Sau Paulo. Brazil. *On the characterization of minimal value set polynomials.*

Let $q$ be a power of a prime, and for any non-constant polynomial $F \in \mathbb{F}_q[x]$, let $V_F = \{F(\alpha) : \alpha \in \mathbb{F}_q\}$ be its value set. One can easily show that $V_F$ satisfies

$$\left\lfloor \frac{q-1}{\deg F} \right\rfloor + 1 \leq |V_F| \leq q, \tag{1}$$

where $\lfloor n \rfloor$ is the greatest integer $\leq n$, and $|\mathcal{S}|$ denotes the cardinality of the set $\mathcal{S}$. Polynomials attaining the lower bound in (1) are called minimal value set polynomials (shortened to m.v.s.p.).

In this talk we discuss some recent results related to the characterization of m.v.s.p's. We present a classification of all minimal value set polynomials in $\mathbb{F}_q[x]$ whose set of values is a subfield $\mathbb{F}_{q'}$ of $\mathbb{F}_q$. Our approach not only provides the exact number of such polynomials, but also allow us to construct many new examples of m.v.s.p.'s, derive a non-trivial lower bound for the number of m.v.s.p.'s with a fixed set of values and give a (conjectural) procedure to obtain all m.v.s.p.'s over $\mathbb{F}_q$. (Received October 25, 2011)