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Jean-Luc Chabert* (jean-luc.chabert@u-picardie.fr), LAMFA/UFR de Sciences,
Universite de Picardie, 33 rue Saint Leu, 80039 Amiens, France. *On the polynomial
closure*. Preliminary report.

Let D be an integral domain with quotient field K . For every subset E of K , the polynomial closure of E with respect to D is known to be the following subset: $\overline{E} = \{x \in K \mid \forall f \in K[x] (f(E) \subseteq D \Rightarrow f(x) \in D)\}$. In general, and in particular for $D = \mathbf{Z}$, this closure is not a topological closure. Nevertheless, in the local case, the question whether the polynomial closure is a topological closure may be raised. If D is a discrete valuation with finite residue field, then the answer is positive. We study here the case where D is any rank-one valuation domain. In particular, we show that \overline{E} contains all the pseudo-limits of the pseudo-convergent sequences of elements of E (a notion introduced and studied by Ostrowski and Kaplansky). (Received February 05, 2009)