1116-12-1752 **Julia F. Knight*** (knight.1@nd.edu) and **Karen M. Lange**. *Lengths of roots of polynomials in Hahn fields.*

It is well-known [**?**] that for a divisible ordered Abelian group G, and a field K that is algebraically closed, or real closed, the *Hahn field* $K((G))$ is also algebraically closed, or real closed. The ideas go back to Newton and Puiseux. Each element r of $K((G))$ is a generalized power series with terms corresponding to elements of a well-ordered subset of G and with coefficients in K. The *length* of r is the order type of the set of $g \in G$ with non-zero coefficient. We give a technical theorem, for the case where G is Archimedean, bounding the length of a root r of a polynomial $p(x)$ in terms of the lengths of the coefficients in $p(x)$. To obtain the technical theorem, we follow unpublished notes of Starchenko, adding further ordinal calculations.

Using the technical theorem, we can prove the conjecture from [**?**], stated in Lange's talk.

References

[1] J. F. Knight and K. Lange, "Complexity of structures associated with real closed fields", *Proc. of London Math. Society*, vol. 107(2013), pp. 177-197.

[2] S. Maclane, "The universality of formal power series fields", *Bull. Amer. Math. Soc.*, vol. 45(1939), pp. 888-890.

(Received September 21, 2015)