Universität Konstanz

Fachbereich
Mathematik und Statistik

Prof. Dr. Salma Kuhlmann
Katharina Dupont
Gabriel Lehéricy

Real Algebraic Geometry II
Exercise Sheet 7

Exercise 1
Let G be an ordered abelian group. Consider $A, B \subseteq G$ well ordered subsets of G. Show that $A \oplus B$ is well ordered.

Exercise 2
Let k be an archimedean ordered field. Let G be a totally ordered abelian group. Show that $\big(k((G)), <_{\text{lex}}\big)$ is an ordered field.
(It has been shown in the lecture that $k((G))$ is a field. It remains to show that $<_{\text{lex}}$ is a field ordering.)

Exercise 3
Let k be an archimedean ordered field. Let G be a totally ordered abelian group.

(a) Give an example showing that in Neumann's Lemma it is necessary to assume $\varepsilon \in k((G^{>0}))$.

(b) Assume $\operatorname{supp} \varepsilon \in k((G^{>0}))$. Show that $\left(\sum_{i=0}^{\infty} \varepsilon^i\right) \big(1 - \varepsilon\big) = 1$.

(c) Let $g_1, g_2 \in G$. Compute the inverse of $t^{g_1} + t^{g_2}$.

The exercise will be collected **Friday, 05/06/2015** at box 13 near F 441.

---

http://www.math.uni-konstanz.de/~ dupont/rag.htm