

# CONTINUOUS AUTOMORPHISMS AND AN EQUIVALENCE RELATION IN $K[[X]]$

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## Abstract

Let  $K$  be an arbitrary commutative field and let  $R = K[[X]]$  be the ring of formal power series in one variable. Let  $G_R$  be the set of all power series of the form  $u = Xv$ , where  $v$  is a unity in  $R$ . Relative to the usual composition  $G_R$  becomes a topological group with respect to the  $X$ -adic topology of  $R$ . We also study an equivalence relation on  $R$ .

Let  $R = K[[X]]$  be the ring of formal power series in one variable over a fixed commutative field  $K$ . We denote by  $\text{ord } f = \min \{i: a_i \neq 0\}$  for any  $f \in R$ . It is well known that  $\text{ord } f$  is a valuation on  $R$  and  $R$  becomes a complete topological ring relative to the topology induced by this valuation.

Let  $G_R = \{u \in R : \text{ord } u = 1\}$

and, for  $u, v \in G_R$  we denote  $(u \circ v)(X) = v(u(X))$ , a new element of  $G_R$ .