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# 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 $ord\, f = min\, \{i: a_i \neq 0\}$ for any $f \in R$. It is well known that $ord\, f$ is a valuation on $R$ and $R$ becomes a complete topological ring relative to the topology induced by this valuation.

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

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