

1086-13-847

Byung Gyun Kang* (bgkang@postech.ac.kr), Dept. of Math., POSTECH, Pohang, South Korea, and **Phan Thanh Toan** (pttoan@postech.ac.kr), Dept. of Math., POSTECH, Pohang, South Korea. *Noetherian property of subrings of power series rings.*

Let R be a commutative ring with unit. Let X and Y be sets of indeterminates over R . We study subrings $R[X;Y,f]$ of $R[X][[Y]]$, where f is a nonnegative real-valued increasing function. These rings $R[X;Y,f]$ are obtained from elements of $R[X][[Y]]$ by bounding their total X -degree above by f on their Y -degree. Such rings naturally arise from studying p -adic analytic variation of zeta functions over finite fields. Under certain conditions, Wan and Davis showed that if R is Noetherian, then so is $R[X;Y,f]$. In this paper we give an equivalent condition for $R[X;Y,f]$ to be a Noetherian ring when Y has more than one variable and f grows at least as fast as linear. It turns out that the ring $R[X;Y,f]$ is not Noetherian for a quite large class of functions f including the functions that were asked about by Wan. (Received September 13, 2012)