How to show that a ring has uncountable krull dimension

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Abstract

Applications in modern Number Theory have led to the study of various p-adically complete non-noetherian rings. For example, the p-adic completion of $\mathbb{R}^+$ was used by Bhatt in a proof of direct summand conjecture. Such rings have many nice properties, but I'd like to highlight an ugly one: they tend to have uncountable krull dimension. We'll talk about what this means, and how one can use ideas from Number Theory to prove it (in the simplest case).

Keywords: Krull dimension, (non-) Noetherian ring, p-adic completion.