

# Upper bounds for $\gcd(u - 1, v - 1)$ , $u, v$ $S$ -units, generalisations and applications (joint works with Zannier)

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## Abstract

Let  $a > b > 1$  be integers. We proved that if  $b^n - 1$  divides  $a^n - 1$  infinitely often, then  $a$  is a power of  $b$ . In a joint work with Bugeaud, we also proved that the inequality  $\gcd(a^n - 1, b^n - 1) \ll \exp(\epsilon n)$  holds for large  $n$ , whenever  $a, b$  are multiplicatively independent. This fact has been generalised to an analogue inequality where  $a^n, b^n$  are replaced by arbitrary  $S$ -units in a number field; we also dispose of an extension to function fields. We shall show several applications to these inequalities, both to arithmetic and to algebraic geometry, as well as formal relations to recent results by Noguchi, Winkelmann and Yamanoi in Nevanlinna Theory.