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Counting numerical semigroups of a given genus via even gaps

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Given a nonnegative integer g , we denote the number of numerical semigroups of genus g by $N(g)$. In 2008, Maria Bras-Amorós conjectured that

- $N(g) + N(g + 1) \leq N(g + 2)$, for all g ;
- $\lim_{g \rightarrow \infty} \frac{N(g)}{N(g-1)} = \frac{1+\sqrt{5}}{2}$;
- $\lim_{g \rightarrow \infty} \frac{N(g)}{N(g-1)+N(g-2)} = 1$.

In 2013, Alex Zhai proved last two statements, but the first one still remains as an open problem. Actually, even the inequality

$$N(g) \leq N(g + 1),$$

which is true for all sufficiently large g , by the previous second statement, is not known if it holds for all g .

In this talk we introduce γ -hyperelliptic semigroups and use it to count numerical semigroups by genus giving some partial results.