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A Note on Extensions of tr

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In this note we investigate the behaviour of the absolute logarithmic Weil-height h on extensions of the field tr of totally real numbers. It is known that there is a gap between 0 and the next smallest value of h on tr , whereas in $\text{tr}(i)$ there are elements of arbitrarily small positive height. We prove that all elements of small height in any finite extension of tr already lie in $\text{tr}(i)$. This leads to a positive answer to a question of Amoroso, David and Zannier, if there exists a pseudo algebraically closed field with the mentioned height gap.

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