

math -- linearly independent arctans

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- *From:* quasi <quasi@xxxxxxxx>
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For n in \mathbb{N} , let $a_n = \arctan(1/n)$.

Let V be the vector space, over \mathbb{Q} , generated by $\{a_n \mid n \text{ in } \mathbb{N}\}$.

Questions ...

- (1) Is V infinite dimensional?
- (2) Assuming the answer to (1) is yes ...

Let S be the set of indices n such that a_n is linearly independent of $\{a_k \mid k < n\}$. Is there a simple algebraic characterization of the elements of S ? If not, is there at least an effective procedure to determine, for a given n in \mathbb{N} , whether or not n is in S ?

quasi

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