



# COLOQUIO DE MATEMÁTICAS

## Linear structure in non-linear situations

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# RESUMEN

This expository talk will focus on the following, surprisingly common, situation: One is given a vector space  $V$  and also a subset  $S \subset V$  consisting of those vectors in  $V$  that have a particular, possibly "strange", property. The question to be examined is: When does  $S \cup \{0\}$  contain a large vector space?

Here's an example:  $V = F(\mathbb{R})$ , the vector space of all functions  $f : \mathbb{R} \rightarrow \mathbb{R}$ . Let  $S$  be the set of those functions  $f \in F(\mathbb{R})$  with the property that for all intervals  $(a, b) \subset \mathbb{R}$ ,  $f(a, b) = \mathbb{R}$ . It might seem amazing that there is any function in  $S$ ; but in fact there is a very large vector space of such functions! We'll discuss this example as well as a number of other, perhaps surprising, situations. (Nothing, or perhaps almost nothing, beyond a first course in calculus will be needed.)

