

This thesis deals with the investigation of Pythagoras numbers of orders in number fields. After a short introduction, where I repeat and define new concepts important for understanding this work, I deal with the necessary characteristics of the trace. The thesis further proves the existence of orders in totally real number fields whose Pythagoras numbers are arbitrarily large and ends with a proof that for any  $N \in \mathbb{N}$ , there is a totally real number field whose maximum order has a Pythagoras number of at least  $N$ .