

# The structure of extension groups in models of ZFC

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ABSTRACT. Since the solution of the Whitehead problem by Saharon Shelah many tools and techniques have been developed in order to determine the structure the group of extensions  $\text{Ext}(G,H)$  for abelian groups or more generally modules  $G$  and  $H$  over commutative domains. In particular, if the first group  $G$  is torsion-free, i.e. has no elements of finite order, then the group  $\text{Ext}(G, H)$  is divisible and therefore its structure is well-known:

$$\text{Ext}(G, H) = \mathbb{Q}^{(\kappa_0)} \oplus \bigoplus_{p \in \Pi} \mathbb{Z}(p^\infty)^{(\kappa_p)}$$

for some cardinals  $\kappa_0$  and  $\kappa_p$  with  $p$  a prime. Which cardinals can appear in this representation is one of the fundamental questions.

We will present an overview of recent results and show how certain prediction principles in various models of ZFC can be used for determining the possible values for the above cardinals and therefore for characterizing  $\text{Ext}(G,H)$ .

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