

# On the Number of Allelic Types for Samples Taken from Exchangeable Coalescents with Mutation and its Asymptotics

Fabian Freund and Martin Möhle

*Mathematisches Institut  
Eberhard Karls Universität Tübingen  
Auf der Morgenstelle 10, 72076 Tübingen, Germany  
E-mail: fabian.freund@uni-tuebingen.de / martin.m0ehle@uni-tuebingen.de*

**Key words:** Coalescent; Distributional recursion; Mutation; Number of types; Simultaneous multiple collisions

Let  $K_n$  denote the number of types of a sample of size  $n$  taken from an exchangeable coalescent process  $\Pi$  with mutation. A distributional recursion in  $n$  for  $K_n$  is shown. If the coalescent does not have proper frequencies, then  $K_n/n$  converges weakly in  $n$  to a limiting variable which can be expressed in terms of the subordinator associated with the coalescent process. For increasing samples, the convergence is shown to hold in the  $p$ -th mean,  $p$  at least 1, and also almost surely, if the coalescent is taken from the subclass of simple coalescents.