

# Connected and irreducible components in families

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Given a scheme or an algebraic stack  $X$  of finite presentation over a scheme  $S$ , it is natural to ask about the behaviour of the connected and irreducible components of the fibres of  $X$  over  $S$ . In order to do so, the natural thing to do is to introduce functors of "relative connected (and irreducible) components" of  $X/S$ . We introduce two definitions of relative components : an "open" and a "closed" version. We study the representability of the associated functors, compare the two versions whenever possible, and give examples and counter-examples. Finally, we apply this to the stack of curves admitting an action of a fixed finite group  $G$ .