# Fitting mixtures of linear mixed models: a case study involving fishery data

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### Abstract

Finite mixture regression models have been extensively used for modelling regression relationships arising from a clustered and heterogeneous population. Within the family of mixtures of regression models, mixtures of linear mixed models also allow to take into account the correlation between observations from the same individual.

In this study, we discuss briefly the procedure for fitting mixtures of linear mixed models to fishery data, by means of maximum likelihood. We pretend to study the relationship between the price per unit of mackerel caught in the coast of Portugal and other covariates, like as, region of fishing, body size of mackerel and year of fishing.

The number of components in the mixture model was deemed to be unknown and estimated from the data.

A mixture of linear mixed models with two components was fitted to the data. The first component contains the highest number of vessels and concerns vessels with a smaller quantity caught, whose price per unit of mackerel is low and which landed almost entirely in North and Center regions of Portugal. A second component has a slightly lower number of vessels and contains vessels that have caught more mackerel whose price per unit of mackerel is high. These vessels have landed mostly in the South region of Portugal.

## Keywords

Mixtures of linear mixed models, EM algorithm, Fishery data.

# References

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