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**Centro de Investigação em Matemática e Aplicações**  
**Departamento de Matemática**

## **Seminário**

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## **One-way fixed effects models with random sample sizes**

**Célia Nunes**

(Assistant Professor, [celian@ubi.pt](mailto:celian@ubi.pt))

University of Beira Interior, Department of Mathematics and Center of  
Mathematics and Applications, Portugal

### **Abstract**

Analysis of variance (ANOVA) is one of the most frequently used statistical analysis in practical applications. It is routinely used in several research areas, namely in medical research. Despite its wide use, it has been applied assuming that sample dimensions are known. The aim of this work is to extend the theory of one-way fixed effects ANOVA to situations where the samples sizes may not be previously known. An illustrative example of this, is the collection of observations during a fixed time period in a study comparing, for example, several pathologies of patients arriving at a hospital. In these cases it is more appropriate to consider the sample sizes

as realizations of independent random variables. We will assume that the occurrences of observations correspond to counting processes, leading us to consider the sample sizes as Poisson distributed. The applicability of the proposed approach is illustrated considering a real data example on cancer registries. We also show how to compute correct critical values, which may be important to avoid working with incorrect test levels. Finally, we carry out with a simulation study, to compare and relate the performance of our approach with the common ANOVA.

**Keywords:** Fixed effects models, random sample sizes, correct critical values, cancer registries.

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