



# Distribution-free prediction intervals for order statistics based on record coverage

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## Abstract

In this paper, based on the largest and smallest observations at the times when a new record of either kind (upper or lower) occurs, we discuss the prediction of future order statistics. The proposed prediction intervals are distribution-free in that the corresponding coverage probabilities are known exactly without any assumption about the parent distribution other than that it being continuous. An exact expression for the prediction coefficient of these intervals is derived. Similarly, prediction intervals for future records based on observed order statistics are also obtained. Finally, two real-life data, one involving the average July temperatures in Neurenburg, Switzerland, and the other involving the amount of annual rainfall at the Los Angeles Civic Center, are used to illustrate the procedures developed here.

**Keywords:** Coverage probability, Current records, Prediction intervals, Record coverage, Order statistics.

**Mathematics Subject Classification** Primary 62G30; Secondary 62E15.

## 1 Introduction

Let  $\{X_i, i \geq 1\}$  be a sequence of independent and identically distributed (iid) random variables. An observation  $X_j$  is said to be an upper (or lower) record if  $X_j > X_i$  (or

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