

Different definitions of the concept of signature and related properties of coherent systems

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The concept of *signature*, originally introduced in 1985 by Samaniego ([2]), progressively revealed afterwards to be a useful tool for different problems in the analysis of coherent systems. Thus the related literature is nowadays quite rich; an up-to-date review is given in [3]. The importance of this concept in networks reliability was pointed out by Elperin et al. in [4]; see also [5], [6] and references cited therein. Different aspects of interest about signatures have been studied e.g. in [7] and [8].

The basic role of the assumption of exchangeability (for the lifetimes of the system components) and the meaning of signature under such an assumption have been studied in [9]-[11]. In [11] a possible use of signature has however been shown for coherent systems with non-exchangeable components.

As a matter of fact it happens that, in the general cases, different definitions of signature can be given, that collapse into one definition in the special case of exchangeability. In this respect, the two concepts of *system signature* and *probability signature* have been recently pointed out in [12], the term “system signature” referring to a concept of combinatorial nature.

In this talk we consider some recent developments along this direction. In particular we discuss the differences between system signature and probability signature. Such a topic leads to considering different properties of coherent systems, among which, in particular, the notion of *weak exchangeability* introduced in [10].

Related with these arguments we present a few illuminating examples that can also give some hints for future research.

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