

S. Kundu,\* Division of Theoretical Statistics and Mathematics, Indian Statistical Institute, 203 Barrackpore Trunk Road, Calcutta 700 035, India

R. A. McCoy, Department of Mathematics, Virginia Polytechnic Institute and State University, Blacksburg, Virginia 24061, U.S.A.

A. B. Raha, Division of Theoretical Statistics and Mathematics, Indian Statistical Institute, 203 Barrackpore Trunk Road, Calcutta 700 035, India

## Topologies Between Compact and Uniform Convergence on Function Spaces, II

### 1. Introduction

The strict topology on the set  $C^*(X)$  of all bounded continuous real-valued functions on a space  $X$  was introduced by Buck [1] for the case that  $X$  is a locally compact Hausdorff space. Other authors have extended and studied this topology on  $C^*(X)$  for  $X$  an arbitrary Tychonoff space (see, for example, [3], [4], [8], [9] and [10]). In [4], Gulick introduced the  $\sigma$ -compact-open topology on  $C^*(X)$ , where convergence is uniform on all  $\sigma$ -compact subsets of  $X$ . This latter topology was independently studied in [5] where the definition was further extended to the set  $C(X)$  of all continuous real-valued functions on a Tychonoff space  $X$ . In the presence of local compactness, Buck observed in [1] that the compact-open topology on  $C^*(X)$  can be generated by a collection of seminorms induced by the collection of continuous functions with compact support. The purpose of this present work is twofold. The first one is to extend the strict topology on  $C^*(X)$  to  $C(X)$  and study it. The second one is to describe the topology of uniform convergence on  $\sigma$ -compact subsets in terms of seminorms arising from a nice subclass of bounded continuous functions. To do this, we introduce a new topology  $\tau$  (to be defined in the next section) on  $C(X)$  and study it extensively. The studies of the strict and the  $\tau$  topologies are closely related.

Throughout the rest of the paper, we use the following conventions. All spaces are Tychonoff spaces, and whenever we deal with local compactness, we

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