ON IDENTIFICATION VIA MULTI–WAY CHANNELS WITH FEEDBACK

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Abstract

"Identification for Multi–way channels" was mentioned by Ahlswede and Dueck [1] as a challenging direction of research.

Here we present in case of complete feedback a rather unified theory of identification. (For the classical transmission problem the dream of such a theory did not get fulfilled for more than twenty years.)

Its guiding principle is the discovery of [2], that communicators (sender and receiver) must set up a common random experiment with maximal entropy and use it as randomization for a suitable (see [2]) identification technique.

Here we show how this can be done in a constructive way.

The proof of optimality (weak converse) is based on a new entropy bound, which can be viewed as a substitute for Fano's Lemma in the present context.

The "single–letter" characterization of (second order) capacity regions rests now on a new "entropy characterisation problem", which often can be solved.

Here this is done for the multiple–access channel with deterministic and for the broadcast channel with randomized encoding strategies.

Keywords and phrases: identification, multi–way channels, feedback, coding scheme, capacity region, randomized strategies.

Footnote

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