

Friday 16th march

Speaker: James Massey, Prof.-em. ETH-Zurich

Title: Zero Error

Abstract:

Channel capacity in information theory is generally understood to mean "small error capacity", i.e., the maximum rate at which information can be transferred with arbitrarily small, but positive, error probability. Shannon himself, however, in 1956, introduced the notion of "zero error capacity", i.e., the maximum rate at which information can be transferred with no errors whatsoever, which has received much less study. These lectures will begin with a review of what is known about zero error capacity. It will then be argued that Shannon's notion of zero error capacity with noiseless feedback is unduly restrictive and a more flexible definition will be offered. The conditions for positive zero error capacity without feedback, with noiseless feedback, and with erasure feedback will be derived. Very simple zero-error-capacity-achieving schemes will be developed for erasure channels with feedback. The new concept of simultaneous certainty, where sender and receiver each know with certainty that the message has been received without error and also know with certainty that the opposite party knows this, will be introduced and related to zero error capacity. The original research presented in these lectures was obtained in collaboration with Dr. Peter C. Massey.