



UMass Lowell Computer Science & Mathematics Joint Colloquium Announcement

Speaker: Rudolf Ahlswede, University of Bielefeld
Date & Time: Tuesday, Oct. 31, 2006, 2:00pm--3:00pm
Place: Olsen 311, Refreshments are served at 1:40pm

Non–binary error correcting codes with noiseless feedback, localized errors, or both

We investigate non–binary error correcting codes with noiseless feedback, localized errors, or both. It turns out that the Hamming bound is a central concept. For block codes with feedback we present here a coding scheme based on an idea of erasures, which we call the **rubber method**. It gives an optimal rate for big error correcting fraction τ ($>1/q$) and infinitely many points on the Hamming bound for small τ . We also consider variable length codes with all lengths bounded from above by n and the end of a word carries the symbol \square and is thus recognizable by the decoder. For both, the \square -model with feedback and the \square -model with localized errors, the Hamming bound is the exact capacity curve for $\tau < 1/2$. Somewhat surprisingly, whereas with feedback the capacity curve coincides with the Hamming bound also for $1/2 \leq \tau \leq 1$, in this range for localized errors the capacity curve equals 0. Also we give constructions for the models with both, feedback and localized errors.

Bio:

Rudolf Ahlswede studied mathematics, physics, and philosophy in Göttingen, where he received his Dr. rer. nat. degree in mathematics in 1966. In 1967 he joined the faculty of the Department of Mathematics, Ohio State University, Columbus, where he was promoted to Associate Professor in 1969 and served as Full-Professor from 1972 to 1976. Since then he has been in Bielefeld, till 2003 as Ordinarius and then as Emeritus. He has been guest of most of the leading research centers in the world. Honors and prizes include an Honorary Doctor of the Russian Academy of Sciences 2001, membership of the European Academy of Sciences 2004, and the 2006 Shannon Award.