Code Theory

Reed-Solomon Code and Decoding Method Weighting Structure of Linear Codes Algebraic-geometric Codes Network Error Correction Codes Secret Dispersion Method by Linear Codes

Regarding the communication channel coding problem in information theory, code theory studies the construction method of error correction codes, the decoding method and the code performance limit. Specialized research started from the latter half of 1950s.

In Japan studies about code theory started from the 1950s. Among others, the invention of the Reed-Solomon (RS) code by S. Arimoto was a world-class achievement that Japan could boast to the world. The invention by S. Arimoto was independent of that by Reed and Solomon and his invention was just one year after their code invention. As for the RS code, the Euclidean decoding method invented by Y. Sugiyama, et al., in 1975 was also a world-class achievement and was later applied to decoding LSI for the RS code, thereby contributing to the practical realization of RS.

The analysis of code construction including the weighting distribution of the linear code by T. Kasami and the diffuse series, called the Kasami series, developed from such research were important and noteworthy achievements in the 1960s and later these were adopted into the third-generation W-CDMA system.

After the 1980s, the uniform construction method of algebraic-geometric codes which was a generalized RS code, a network error correction code which was able to correct errors in links in network coding, and the performance analysis of the secret dispersion method using the linear code were world-class achievements.