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**QUANTISIERT ADAPTIVE ENTZERRUNG VON
FERNSPRECHLEITUNGEN ZUR DATENÜBERTRAGUNG**

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Abstract

A new method for an automatic equalization of linear distortions in a data transmission system is proposed.

Most of the linear adaptive equalizers known until today use gradient methods to calculate the settings of variable coefficients of a transversal filter. These equalizers can compensate for a priori unknown channel distortions in order to get a signal at the receiver output with sample values close to ideal reference values.

The concept of a quantized adaptive equalizer is proposed assuming a channel with only a finite number of different transmission characteristics. The equalizer consists of a set of filters individually matched to a certain channel characteristic. A special analyzer measures and compares simultaneously the residual distortion of the different filter output signals. The signal with the least distortion is chosen and connected to the output of the receiver.

The description of two implementations of the quantized adaptive equalizer is followed by a discussion of linear distortions in the public telephone network in order to define a model of the channel. The properties of the equalizer are compared with corresponding performance characteristics of conventional adaptive equalizers. Different methods for the selection of the best filter are analyzed theoretically and the results are compared with measured results from a realized single sideband data transmission system using quantized adaptive equalization.

Under equivalent assumptions with respect to the data modem, the time to choose the optimum filter is shown to be similar to the start-up time for an adaptive equalizer after perfect orthogonalization of the tap input signals [22]. The setting of the equalizer is stable under all conditions. The optimum filter can be chosen without the use of a particular test sequence. The fixed values of the tap settings of the equalizer permit a delay of each filtered signal in order to detect it without a loss of information after the choice of a particular filter.