STATISTICAL TIME DIVISION MULTIPLEXING ARCHITECTURES AND DESIGN

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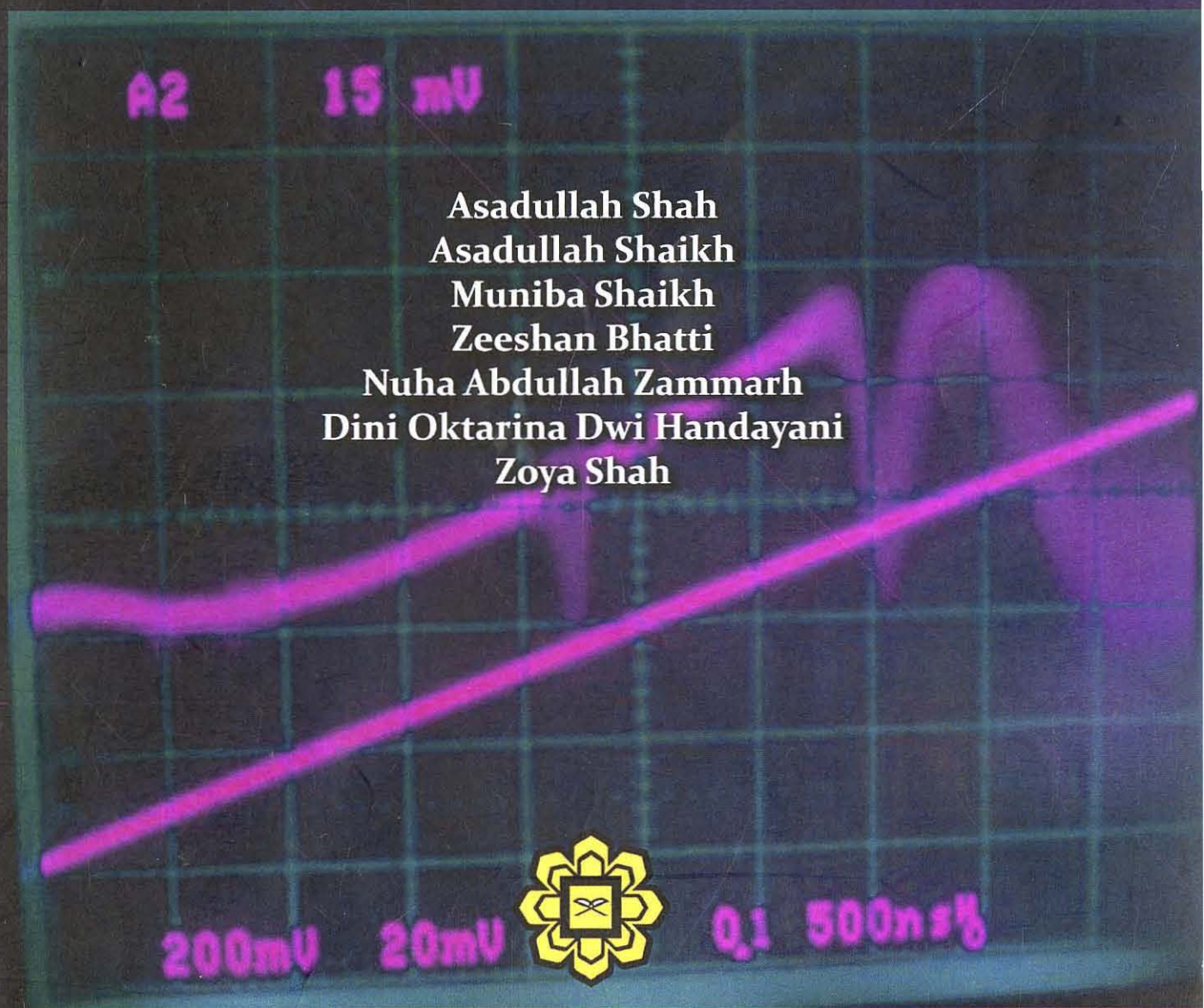

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12. Quality Assessments in multiplexing

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12.0 Abstract

Considering low bit rate sources the quality of speech suffers mainly by a factor, such as quantization noise. Multiplexing efficiency is therefore, based upon the encoding sources bit rates. Lower the coding rates, better the efficiency but on the expense of quality. The quality in multiplexing is assessed by two means, objectively and subjectively. In this chapter the quality assessment by both objective and subjective means is discussed for the STDM design considerations.

12.1 Quantisation noise:

At low bit rates speech quality suffers of quantisation noise. It increases as bit rates drop. This noise causes the masking effects and covers the low energy level speech segments by higher noise levels.

Objective quality measures are reported which measure distortion between the input and output signals of speech codecs. These are classified into time and frequency do-main. Lon9 term signal-to-noise ratio (SNR) is a measure of overall samples of the utterance. That is the ratio between the long-term signal energy and the long-term noise energy, the noise energy being defined as the difference between reference signal s_{ref} (k) and output signal (reconstructed) s_{rec} (k). As reported among time domain measures, segmental SNR corresponds better to subjective measures than long-term SNR.

12.2 Segmental Signal-to-Noise Ratio: SNRseg

Traditionally the SIN value has been used as an objective waveform distortion measure for higher bit rate coding systems in telecommunications networks. SIN is defined as the long-term signal power to long-term quantising noise power ratio using sinusoidal signal as a reference test signal. The SIN value is not sufficient for measuring various kinds of coding systems with new adaptation techniques; the sinusoidal signal cannot measure the quantisation noise of new coding systems with no uniform frequency characteristics, and the long-term calculation methods weights the larger energy parts of sentences more heavily than the smaller energy parts.