Answer Sheet - Afe Babalola University

Question No.: 04

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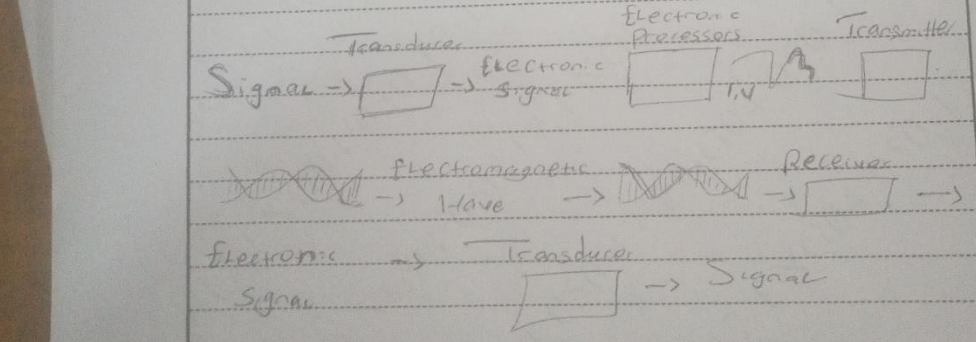
17/Engo4/050
Elect/Elect.
EEE 471

(a) Signal Processing is concerned with improving the quality of the reading or Signal at the output of a measurement System and one particular aim to attenuate any noise in the measurement Signal that has not been eliminated by careful design of the measurement System.

This is also an Electrical Engineering Subfield that focuses on analysing, modifying, and Synthesizing Signals Such as Sound, Images, and Scientific measurements.

The techniques can be used to improve transmission, Storage efficiency and Subjective quality and to emphasize or detect components of interest in a measured Signal.



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The techniques in Signal Processing goes as follows

Analog

Continous time

Discrete time

Digital

Non-linear

Statistical

Analog: Analog

This is for Signals that have not been digitized, as in most 20th Century radio, telephone, radar, and television systems. This involves linear electronic circuits as well as non-linear ones. The former are, for instance, Passive Filters, Active Filter, Additive mixers, Integrators, and delay lines. Non-linear circuits include Compandors, multipliers, Frequency mixers, Voltage-Controlled amplifiers, Voltage Controlled filters, Voltage Controlled oscillators, and Phase-locked loops.

Continous time

Continous-time Signal Processing is for Signals that Vary with the Change of continous domain (without considering some individual interrupted points).

The methods of Signal Processing include time domain, frequency domain, and complex frequency domain. This technology mainly discusses the modeling of linear time-invariant continous system, integral of the system's zero State response, setting up system

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System functions and the continuous time filtering of deterministic signals:

Discrete time

Discrete-time Signal Processing is for Sampled Signals, defined only at discrete points in time, and as such are quantized in time, but not in magnitude.

Analog discrete-time Signal Processing is a technology based on electronic devices such as sample and hold Circuits, analog time-division Multiplexers, analog delay lines and analog feedback Shift registers. This technology was a predecessor of digital Signal Processing, and is still used in advanced processing gigahertz Signals.

The concept of discrete-time Signal Processing also refers to a theoretical discipline that establishes a mathematical basis for digital Signal Processing, without taking quantization error into consideration.

Digital

Digital Signal Processing is the processing of digitized discrete-time sampled Signals. Processing is done by general-purpose computers or by digital Circuits such as ASICs, field-Programmable gate arrays or specialized digital Signal Processors (DSP Chips). Typical arithmetical operations include fixed-point and floating-point, real

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Valued and Complex-Valued, Multiplication and addition. Other typical operations supported by the hardware are circular buffers and lookup hardware and Circular buffers and look-up tables. Examples of algorithms are the fast fourier transform [FFT], finite impulse response [FIR] filter, infinite impulse response [IIR] filter, and adaptive filters such as the LMS and Kalman filters.

Non-Linear

Non-linear Signal Processing involves the analysis and processing of signals produced from non-linear systems and can be in the time, frequency or spatio-temporal domains. Non-linear systems can produce highly complex behaviour including bifurcations, chaos, harmonics, and subharmonics which cannot be produced or analyzed using linear methods.

Statistical

Statistical Signal Processing is an approach which treats signals as stochastic processes, utilizing their statistical properties to perform signal processing tasks. Statistical techniques are widely used in signal processing applications. For example one can model the probability distribution of noise incurred when photographing an image, and construct techniques

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based on this model to reduce the noise to the results image.

(2) To artificial intelligence, an expert system is a computer system emulating the decision making ability of a human expert. Expert systems are designed to solve complex problems by reasoning through bodies of knowledge, represented mainly as if-then rules rather than through conventional procedural code.

~~The first expert systems~~

An expert system is divided into two subsystems: the interference engine and the knowledge base. The knowledge base represents facts and rules. The interference engine applies the rules to the known facts to deduce new facts. Interference engines can also include explanation and debugging abilities.

Advantages:

-> To make the critical information required for the system to work explicit rather than implicit.

-> Used to specify the rules in a format that was intuitive and easily understood, reviewed, and edited by domain experts rather than IT experts.

Disadvantages

-> In the academic literature is the knowledge acquisition problem

-> Seem at least as critical as knowledge acquisi