

① L11B01 G TSB4 ? (TUMI)

18/04/082

tec 471 <Instrumentation>

QUESTION 1

Signal processing involves analysing, modifying & synthesising signals such as sound, images & scientific measurements. Signal processing techniques can be used to improve transmission through, efficiency & subjective quality of to also emphasise components of interest in a signal.

Categories of signal processing

- ① Analog signal processing
- ② Continuous-time signal processing
- ③ Discrete-time signal processing
- ④ Non-linear signal processing
- ⑤ Statistical signal processing
- ⑥ Digital signal processing

① Analog signal processing

This is for signals that have not been digitised. This involves linear electronic circuits as well as non linear ones. The linear technique passive & active filter

② Continuous time s-p

This is for signals that vary with ~~time~~ the change of continuous domain. The methods of this signal processing include time domain, frequency domain & complex frequency domain

(3) Discrete time :- This is for sampled signals, defined only at discrete points in time t , as such are quantized in time, but not in magnitude. Analog discrete-time signal processing is based on electronic devices.

(4) Non linear S-P :- This involves the analysis & processing of signals produced from non linear systems & can be in the time, frequency or spatio-temporal domains. Non linear systems can produce highly complex behaviours including chaos, harmonics & subharmonics which cannot be produced or analysed using linear methods.

(5) Statistical S-P :- This is an approach which treats signals as stochastic processes, studying their statistical properties to perform signal processing tasks.

Applications

- Audio signal processing
- Image processing
- Video processing
- Wireless communication
- Control systems
- Process control

Question 2

An expert system is one which emulates 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 conventional procedural codes.

There are 2 subsystems to an expert system namely:-

- 1) Interface engine
- 2) Knowledge base

The knowledge base represents the facts of the rules. The interface engine applies the rules to the known fact to deduce new facts.