Joshua Anderson CS 582 Midterm Exam Date 10-26-21

1. Differentiate between WANs and LANs.
↳ The differences between WANs and LANs would be considerd quite simple. A WAN stands for a wireless area network. It is used to provide internet as well as other network services. A LAN connection is used for grouping computer systems and network components together to use internally.

2. (a) $2\sin(2\pi ft - \pi) + \sin(2\pi ft + \pi)$

$\sin(a+b) = \sin a \cos b + \cos a \sin b$

$\sin(2\pi ft - \pi) = \sin(2\pi ft)\cos\pi - \cos(2\pi ft)\sin\pi$

$\sin(2\pi ft - \pi) = -\sin(2\pi ft)$

$\sin(2\pi ft + \pi) = \sin(2\pi ft)\cos\pi + \cos(2\pi ft)\sin\pi$

$\sin(2\pi ft + \pi) = \sin(2\pi ft)$

$\Rightarrow -2\sin(2\pi ft) + \sin(2\pi ft) = \boxed{-\sin(2\pi ft)}$

(b) $2\sin(2\pi ft) + 2\sin(2\pi ft - \pi)$

$2\sin(2\pi ft - \pi) = -2\sin(2\pi ft)$

$2\sin(2\pi ft) - 2\sin(2\pi ft)$

$\Rightarrow = 0$

3. Find the amplitude, frequency, and phase for the signal $(100\sin(8\pi ft + 2\pi))$

→

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3 cont'd. $100 \sin(8\pi ft + 2\pi)$

↳ $A \sin(\omega t + \phi)$

= Amplitude = A = $\boxed{100}$

= frequency = $\frac{1}{\text{period}} = \frac{2\pi}{8\pi} = .25\pi = \frac{1}{.25\pi} = \boxed{4\pi}$

= phase = $\boxed{2\pi}$

4. Why does the TCP header have a header length field while the UDP header does not? And what is the difference between UDP and TCP?

↳ The TCP header field is varied across the network, so the TCP contains the header length field separately. But, UDP protocol contains fixed header size and doesn't require separate fields. There are many differences between UDP and TCP, a few differences are: ① TCP is a connection protocol, whereas UDP is a contactless protocol. ② TCP is much slower than UDP; it is significally faster. ③ TCP does error checking and also makes error recovery, while UDP performs error checking but discards erroneous packets.

5. What tasks are performed by the transport layer?

↳ The main task of this layer is to perform the data tranfer transparently between end points. Also, it provides end-to-end delivery.