Chapter Test

Q 1. What is not component of digital A/D converter?

① Sample-Maintenance circuit ② Comparator
③ 2' complement counter ④ Notch Filter

Q 2. What is A/D converter?

① Convert sampling frequency.
② It is included in PCM decoder.
③ Pulse having amplitude of message signal during sampling.
④ It has code word depending on amplitude of message signal including quantization and coding.

Q 3. What is output of D/A converter?

① Shape of step form wave similar to original message signal.
② Shape with changed frequency of original message signal.
③ Same shape of original message signal.
④ Digital expression of original signal.

Q 4. What is low-pass filter?

① Increase conversion time of A/D converter.
② Filtering amplitude out of input range of A/D converter.
③ Convert received serial code of D/A converter to parallel code.
④ Make restored step form wave by D/A converter to be close to original signal.

Q 5. What is resolution when analog input voltage +2.0[V] would be 4-bit coded?

① 0.25 [V] ② 0.5 [V]

③ 0.75 [V] ④ 1.0 [V]

Q 6. When clipping distortion would be occurred?

① Clock frequency is too high.

② The length of code word is too short.

③ The amplitude of analog signal is changed rapidly.

④ The amplitude of analog signal exceeds input range of A/D converter.

Q 7. What is signal-to-quantization noise ratio on PCM system?

① It is ratio between input and output voltage.

② It is ratio between signal voltage and total noise voltage.

③ It is ratio between signal voltage and residual noise voltage.

④ It is ratio between signal voltage and quantization noise voltage.

Q 8. When aliasing would be occurred?

① When flat-top sampling is used.

② When sampling rate is less than Nyquist rate

③ When anti-aliasing filter is used.

④ When message signal has a few frequency elements.

Q 9. How much S/N_q would be increased if resolution of PCM system is increased 1-bit?

① 1 dB ② 3 dB

③ 6 dB ④ 9 dB

Q 10. How much the quantization interval would be needed for quantizer having 4-bit resolution and ± 1V input range?

① 0.125 [V]

② 0.25 [V]

③ 0.5 [V]

④ 0.75 [V]

4. self-check

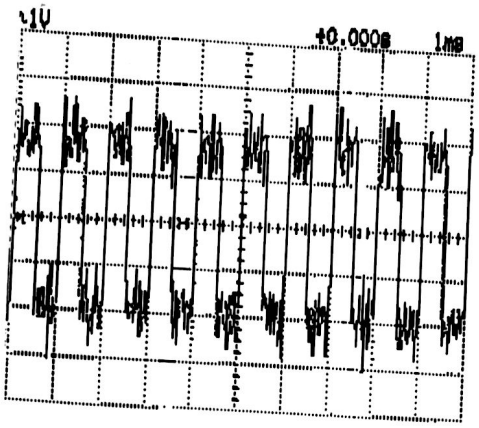
1. Explain the principle of A/D and D/A conversion.

2. What is minimum size of clock frequency needed for converting analog input signal having frequency characteristics of 1[kHz]?

3. What is code word from output of A/D conversion?

4. How the length of code word and resolution within given voltage rage?

5. What is the interval of quantization of 8-bit D/A conversion having input range of ± 4.0 V?



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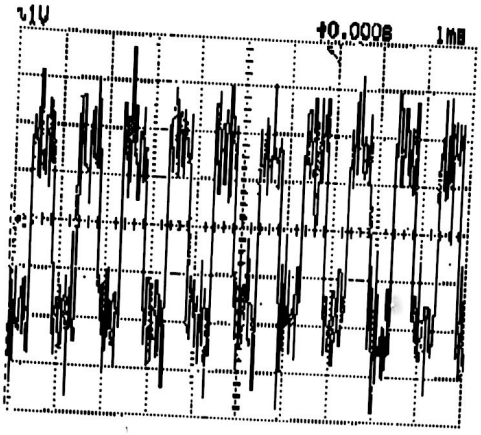

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Figure 2-18. Noise in pulse signal

5. Self-Check

1. What is white noise?

2. What about power of band limited white noise if bandwidth would be increased?

3. Define the decibel.

4. What's the value of valid noise power in output of system? In this system noise power spectrum density S_n is 3×10^{-8}[W/Hz] and bandwidth is 1[MHz].

5. How about signal-to-noise ratio[dB] if signal power is 5[mW] and noise power is 0.1[mW]?

Chapter Test

Q 1. What's the value of old duty cycle of pulse having 10[μs] pulse width and 10[ms] cycle?

① 0.001[%] ② 0.01[%]

③ 0.1[%] ④ 10[%]

Q 2. What's rising time of pulse?

① Time needed for reaching from 10% to 25% of average amplitude.

② Time needed for reaching from 10% to 50% of average amplitude.

③ Time needed for reaching from 10% to 90% of average amplitude.

④ Time needed for reaching from 25% to 50% of average amplitude.

Q 3. Why over shoot would be occurred in output pulse of system?

① When system extremely emphasize high harmonic frequency.

② When system extremely emphasize low harmonic frequency.

③ When system has global bandwidth.

④ When the lowest limit cutoff frequency is zero.

Q 4. What is wrong definition of cutoff frequency of system?

① Frequency would be $1/\sqrt{2}$ of original signal amplitude.

② Frequency would be 1/2 of transmission signal power.

③ Frequency that transmission power would be decreased as much as 3[dB]

④ Frequency that transmission power start to decease.

Q 5. What's the pulse repetition frequency when cycle of pulse is 10[μs]?

① 0.1[kHz] ② 1[kHz]

③ 0.1[MHz] ④ 1[MHz]

Q 6. What's the relationship between rising time and bandwidth of pulse if pulse signal is limited?

① Rising time and bandwidth are equal.

② Rising time is perorational to bandwidth.

③ Rising time is adversely perorational to bandwidth.

④ There is no relationship.

Q 7. What's the value of noise power in case of band limited white noise?

① It is proportional to bandwidth.

② It is adversely proportional to bandwidth.

③ There is no relationship with noise power spectrum density.

④ It is adversely proportional to noise power spectrum density.

Q 8. What is duty cycle that direct current element pulse signal not to effect on rms signal power?

① In case of extremely low.

② In case of extremely high.

③ In case of 50[%].

④ In case of over 75[%].

Q 9. What is *SNR*?

① Signal power[W] and noise power[W] ratio.

② Signal power[dB] and noise power[dB] ratio.

③ The difference between signal voltage and noise voltage.

④ The difference between signal voltage and noise voltage.

Q 10. What about *S/N* [dB] if signal power is -10[dB] and noise power is -30[dB]?

① 5[dB]　　② 10[dB]

③ 20[dB]　　④ 40[dB]