

2020 Advanced Information Engineering
Assignment #1 October 12, 2020

Objective

To understand basic properties of digital image signals.

Exercises

1. Calculate bit-rate of a color (3 channels) video signal with tone 256, spatial resolution 4000×3000 , 60[fps].
2. Let's think about a black and white video signal with spatial resolution 1000×1000 which has 30 frames per second and whose pixels are represented by 10 bits.
 - (a) Calculate bit-rate [bps].
 - (b) Calculate compression ratio = (compressed file size/original size) in order to transmit at bit-rate 1M[bps].
3. We quantize signals whose dynamic range is equal to 1 and pixels are represented by 10 bits. Calculate the maximum value of quantization error.
4. When we sample signals with F and $F' = F + kF_s$, where k is integer and F_s is a sampling frequency, prove that their sampling values are identical.

Due date

By 10AM, October 19, 2020 (Monday) before the beginning of the class.

How to submit

Please submit a hand-written report to my office (Room 210, Eng. Build. No.1) or scan your report and send a copy of its pdf file to me (miura.kenjiro@shizuoka.ac.jp).