

# **EE 193** Imaging systems: Image representation + MATLAB

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# Image representation



# How should we encode brightness?

8-bit integers

16-bit integers

32-bit integers? 64-bit?

floating point (32 bits)

double-precision floating point (64 bits)

1-bit integers?

half-precision floating point? (16 bits)

Which side of the screen is brighter?  
(or are they the same?)



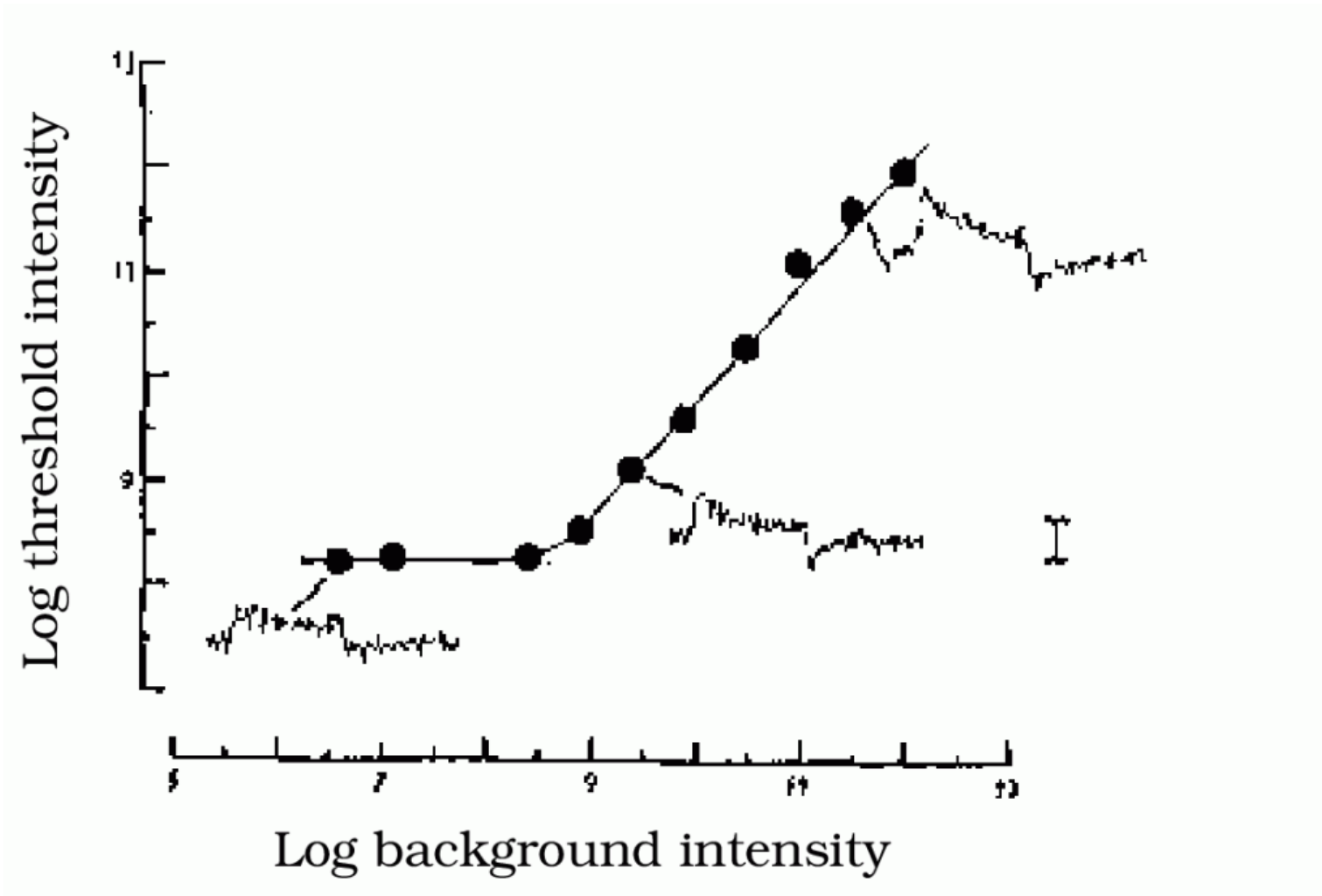




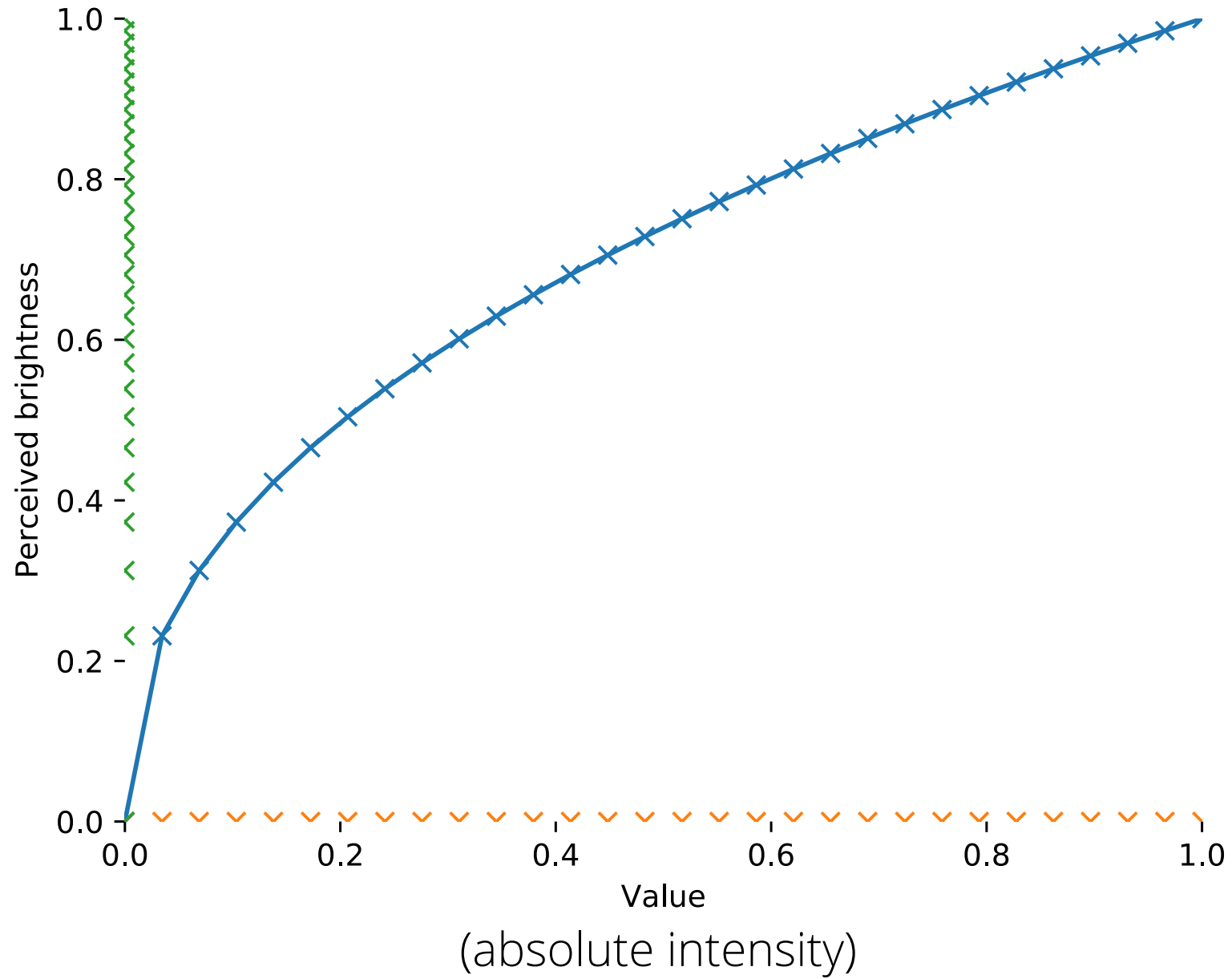




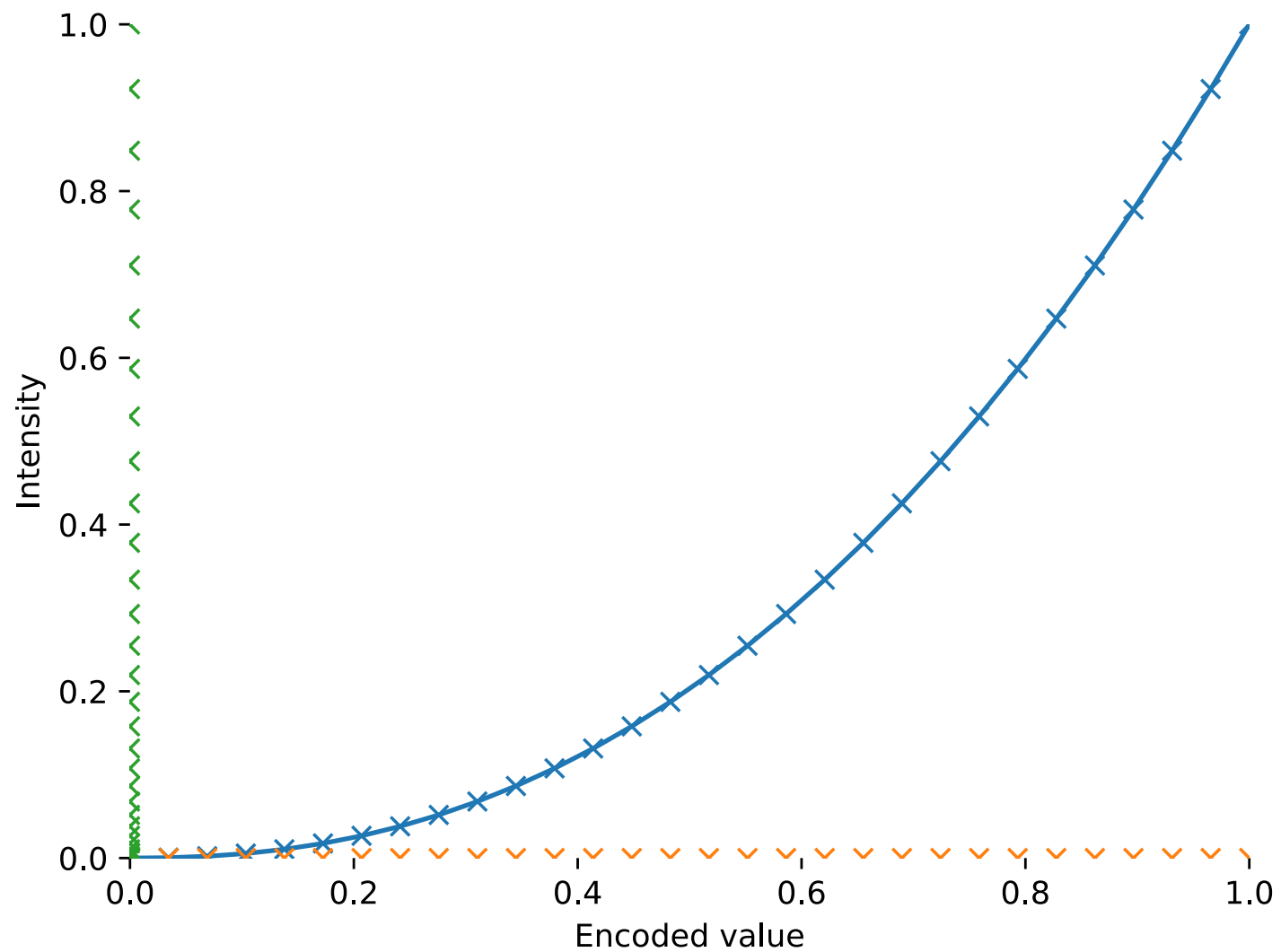




(Enroth-Cugell et al. 1977, via Wandell)



# Intensity vs encoded value



# Gamma correction

When a camera captures an image, intensities are gamma-encoded:

$$V = AI^{1/\gamma}$$

When you display this image, the display decodes the gamma:

$$I = (V/A)^\gamma$$

Typical value is  $\gamma=2.3$

# For Tuesday

Homework 1 is due in class

# MATLAB demo

Quick reference is on the website:

<http://www.ece.tufts.edu/ee/193HIP/matlab.html>