

# HOMWORK ASSIGNMENT 7 (THEORY)

CO19-320322: COMPUTER GRAPHICS  
320322: GRAPHICS AND VISUALIZATION

Fall 2016

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**Due: Friday, November 11, 2016, at 8pm.**

## Problem 7: Color Models

(7+2+6=15 points)

- (a) *CMYK to HSV*. Convert the CMYK color  $c_{CMYK} = (0.5, 0.3, 0, 0.4)$  to an HSV color. Convert the HSV color  $c_{HSV} = (245^\circ, 0.5, 0.8)$  to a CMYK color. How would you describe the two colors with words?
- (b) *HSV vs. HLS*. Figure (1) below shows a color image and Figures (2) and (3) show one channel of the HSV and the HLS color model, respectively. Explain which figure uses the HSV and which the HLS color model and explain which channel is shown.



- (c) *Perceptual uniformity*. Compute a color that is perceptually exactly between the RGB color  $(1.0, 0.5, 0)$  and the RGB color  $(0, 0.25, 1)$ . To do so, convert the RGB colors to CIE  $L^*a^*b^*$  colors, compute the average of the converted colors in CIE  $L^*a^*b^*$  space, and convert the resulting color back to RGB space. Is the resulting RGB color the same as taking the average of the given RGB colors? Why (not)? *Note that for this part you do not need to do the computations by hand!*

**Remarks:** The theoretical assignments have to be submitted in paper form into the box labeled “Linsen” in the Research I entrance hall. In case the theoretical part is typed (e.g., using  $\LaTeX$ ), the generated PDF-file can also be uploaded to jGrader.