

4 Introduction to Graphics (rkm38)

- (a) What are typical applications of RGB, HLS, and CIE L*a*b* colour spaces? Compare and contrast these spaces. [7 marks]
- (b) Explain the purpose of two-step transformation from linear, scene-referred colour values to the display encoded values. [7 marks]
- (c) An image is given in a *linear* ITU-R 2020 RGB colour space (display referred). Write down a sequence of equations to transform pixel values in that image into a *gamma-corrected* ITU-R 709 RGB colour space. Use the symbol $M_{2020|XYZ}$ to denote the 3×3 matrix for transforming from ITU-R 2020 to the CIE XYZ colour space; and the symbol $M_{709|XYZ}$ to denote the 3×3 matrix for transforming from ITU-R 709 to the CIE XYZ colour space. Use a standard gamma formula with $\gamma = 2.2$. [6 marks]