

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  $3 \times 3$  matrix for transforming from ITU-R 2020 to the CIE XYZ colour space; and the symbol  $M_{709|XYZ}$  to denote the  $3 \times 3$  matrix for transforming from ITU-R 709 to the CIE XYZ colour space. Use a standard gamma formula with  $\gamma = 2.2$ . [6 marks]