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Principles of colour appearance and measurement

Volume 1: Object appearance,
colour perception and instrumental
measurement

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Geometric attributes of appearance can be perceived visually as different from colour. These attributes may be identified as gloss, haze, transparency, opacity, etc. The complexity of interacting light cannot be classified into a small number of classes. As a result, a large number of measures are used and a variety of geometric scales are established to meet varying requirements. Goniophotometers, glossmeters, reflectometers and transmission meters are used for measurement of geometric attributes.

A number of methods are available for orderly arrangement of colours, called colour order systems (Volume 2, Chapter 10). For geometric attributes, efforts have been made by Jannello (1984) to establish some ordering system based on visual texture i.e. visual perception other than colour to explain phenomena such as transparency, translucency, opacity, brilliancy, specular reflection, etc. He developed a theory called the Theory of Spatial Delimitation, and defined a new term, *Cesia* – the quantity or spatial distribution of the luminous flux that reaches the eye after interaction with the object. Three variables of *Cesia* are described to be:

1. Absorption,
2. Permeability and
3. Diffusivity.

Notations can be derived in terms of the above three parameters for various solids such as transparent, translucent, absorbent, specular, glossy, lustrous, bright, matte, etc. (Caivano, 1991).

Jannello showed that the geometric attributes of appearance can be organised in a coordinate system and that synthetic stimuli can be produced by means of spinning disc, just as they are produced for colour by the mixture of three lights, using five primary sensations of *Cesia*, namely transparence (100% or coefficient = 1 for air), specular reflection ((100% or coefficient = 1 for aluminium evaporated to glass), translucence (perfect diffuse and totally transmitting, no ideal material), diffuse reflection (ideal material pure BaSO_4), and absorption. For each of the above, five steps of achromatic sensation were created by different types of spinning discs. According to him, it would be possible to build an atlas of *Cesia*, but the major difficulty is that different geometries of observation are needed for visual assessment of different kinds of scales. The assessment also depends on illumination and angle of viewing.

3.6 Colour attributes

Colour plays a very important in our everyday lives. It influences our moods and emotions and generally enhances the way in which we enjoy our surroundings. Natural colours are all around us, in the earth, the sky, the sea,

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