Institute of Engineering
JIWAJI UNIVERSITY

PRESENTATION
ON
TV & RADAR

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EL- 804

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COLOUR TV FUNDAMENTALS

In system we are sending only the luminance information. But in colour system we have to send information about the colours also. All colour TV system are based on the principle of our eye. Here wavelength unit is Arm strong. Visible spectrum – 4000 Aº to 7000 Aº.
1Aº = 10-10m 1nm = 10Aº

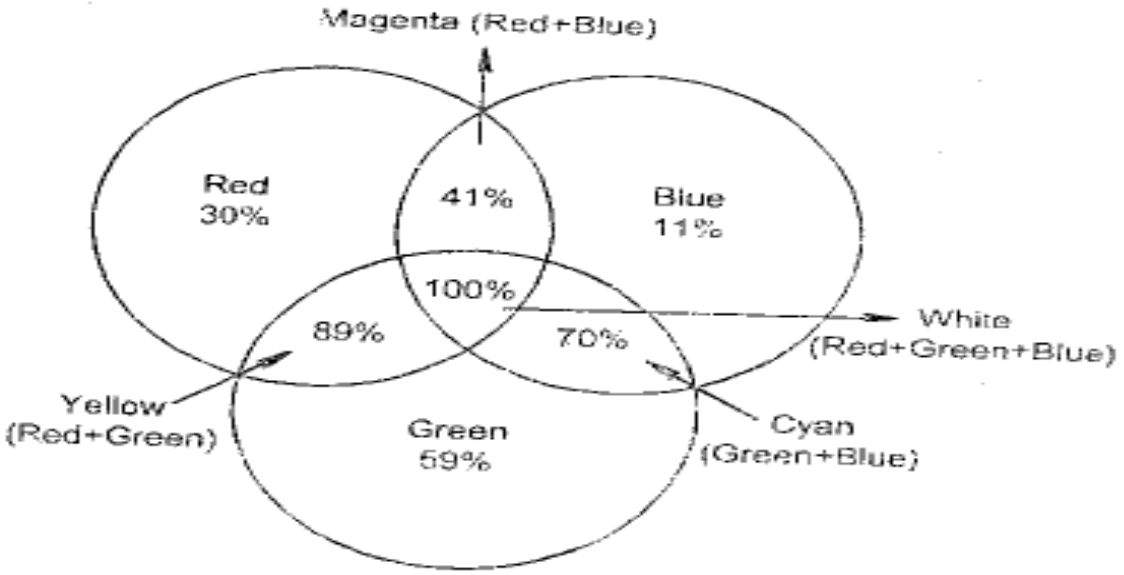
The three basic colors are called as primary colors. They are Red,Green and Blue. To get different color shading we have to mix primary colors. We have two types of mixing

- Additive Mixing
- Subtractive Mixing.

ADDITIVE MIXING

In this method two or three primary colours are mixed together to form a new color. By mixing primary colours with different intensities we can obtain all types of colours.

Fig shows the method of additive mixing. By mixing 30% Red, 59% Green and 11% blue we can get white color



Y = 0% + 59%9+11%B
Red + Blue = Magenta (41%).
Blue + Green = Cyan (70%)
Red + Green = yellow (89%)

COMPLEMENTARY COLOUR:

Color obtained by mixing only two primary colours is called as complementary colours.

Primary	Complementary
Red + Green	= Yellow
Red + Blue	= Magenta
Blue + Green	= Cyan

SUBTRACTIVE MIXING

In Subtractive mixing, the reflecting properties of colour pigments are used. A colour pigment can absorb all the colour wavelength except its characteristic colour wavelength. Its characteristic colour frequency alone is reflected. If we are mixing two or three colour pigments, then a color wavelength common to them only reflected. This method of mixing is generally used in colour printing and colour painting. By mixing primary colours, black colour is got. Different colours are obtained by subtracting primary and secondary colours from white. So this is called as subtractive mixing.

COLOUR PERCEPTION

The retina on the backside of our eye has light sensitive organs. They can be able to sense the light variations. Also the retina is connected to optical centre of the brain optical nerves.

We have two types of light sensitive organs. They are called rods and cones. Rods are used to identify brightness variations. Cones are used to identify color information. The colours are transferred to optical nerves. They are then mixed together to identify the original colour.

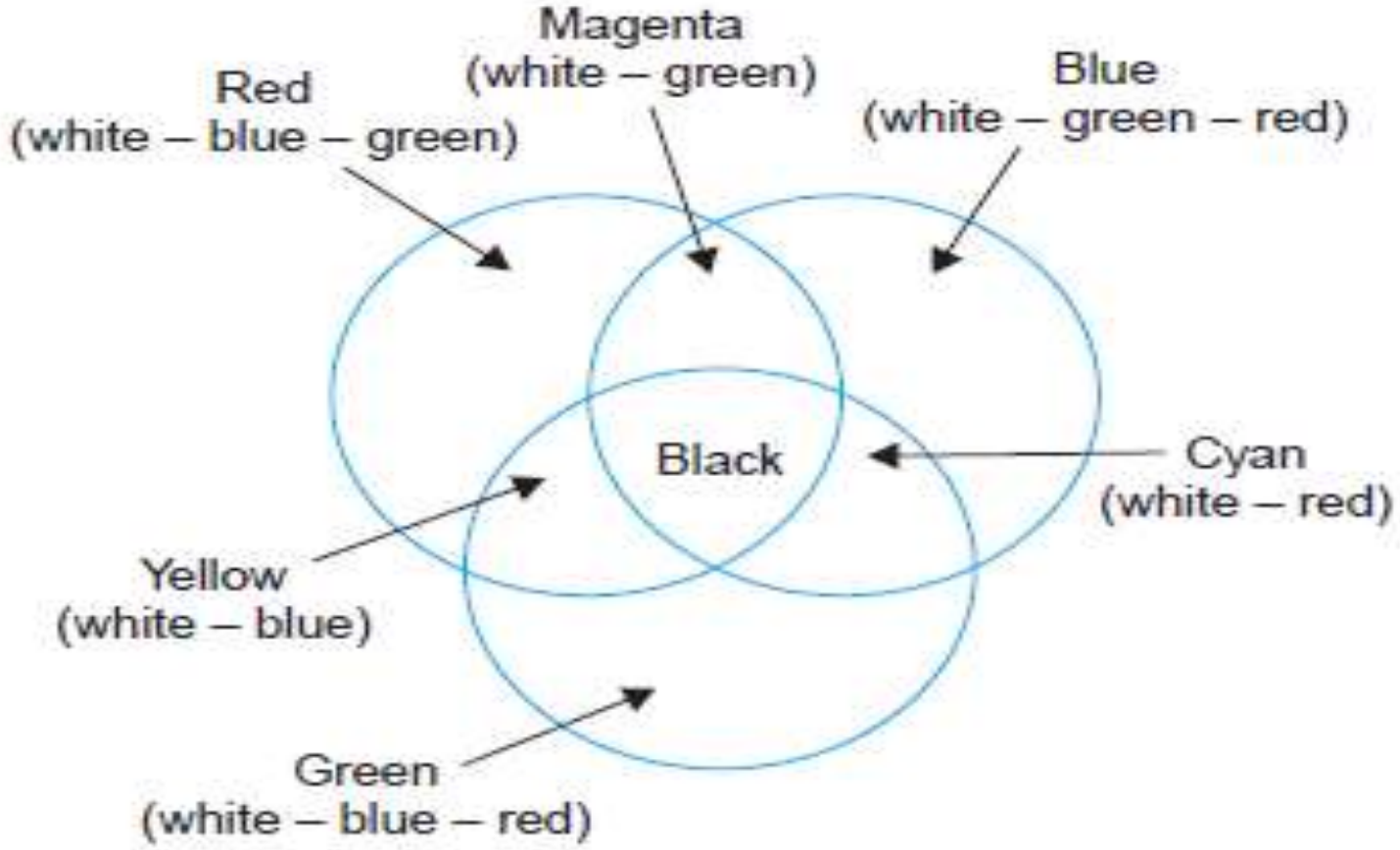
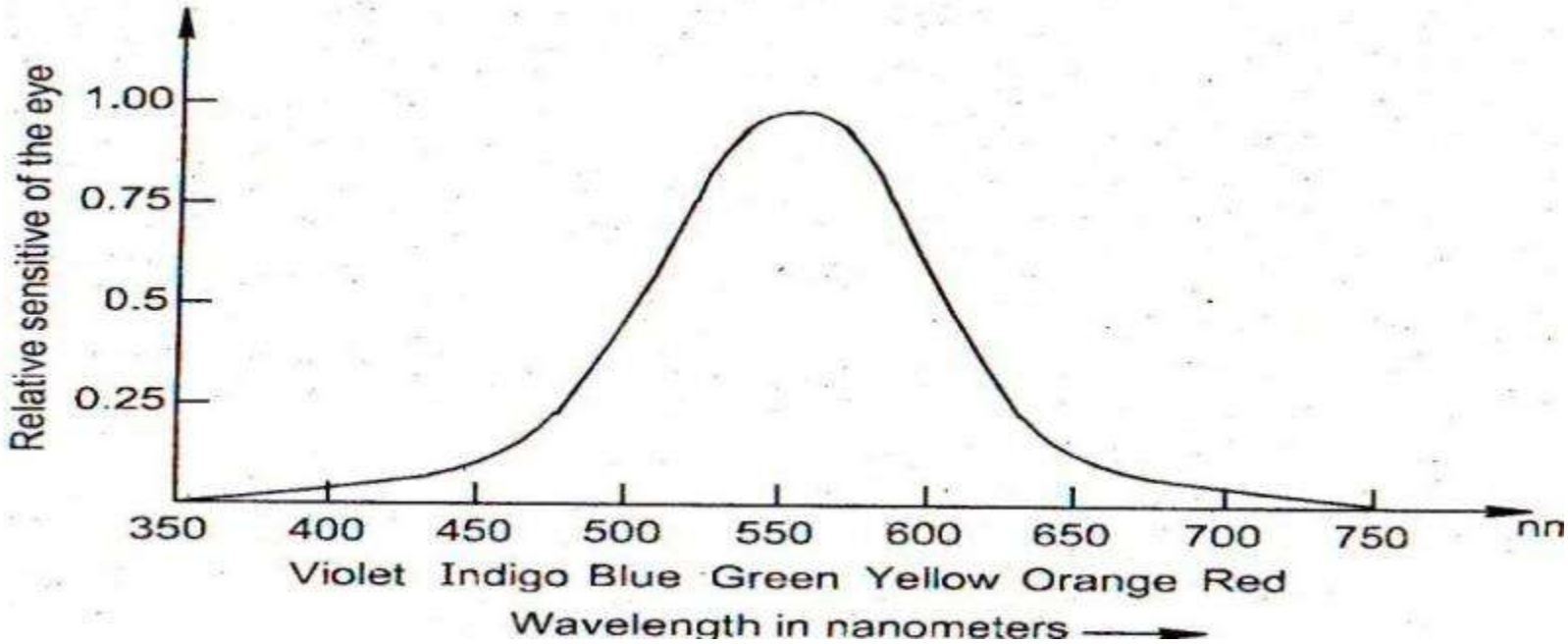


Fig. 25.3 (b). Subtractive colour mixing. The diagram shows the effect of mixing colour pigments under white light.


Relative sensitive of the eye
1.00
0.75
0.5
0.25
350
400
450
500
550
600
650
700
750
nm
Violet Indigo Blue Green Yellow Orange Red
Wavelength in nanometers

CHROMATICITY DIAGRAM

Chrominance or chromaticity diagram is a graphical representation of primary colours and all other colours in a space co-ordinate. Based on principle of tristimulus value, white color is formed by mixing 30% red, 59% green and 11% blue.

Below Fig is a two dimension graph representing hue and saturation on x-y plane. In 3D representation 2 axis is used to identify the brightness of the color.

Chromaticity diagram is in shape of horse shoe. On the three corners we have primary colours and on perimeter different colours are available. On moving towards centre pure colours are mixed with white and desaturated. Point ‘C’ represents white color. This point is at co-ordinate of x = 0.31,

y = 0.32. Sunlight, sky light and day light are all different forms of white light.

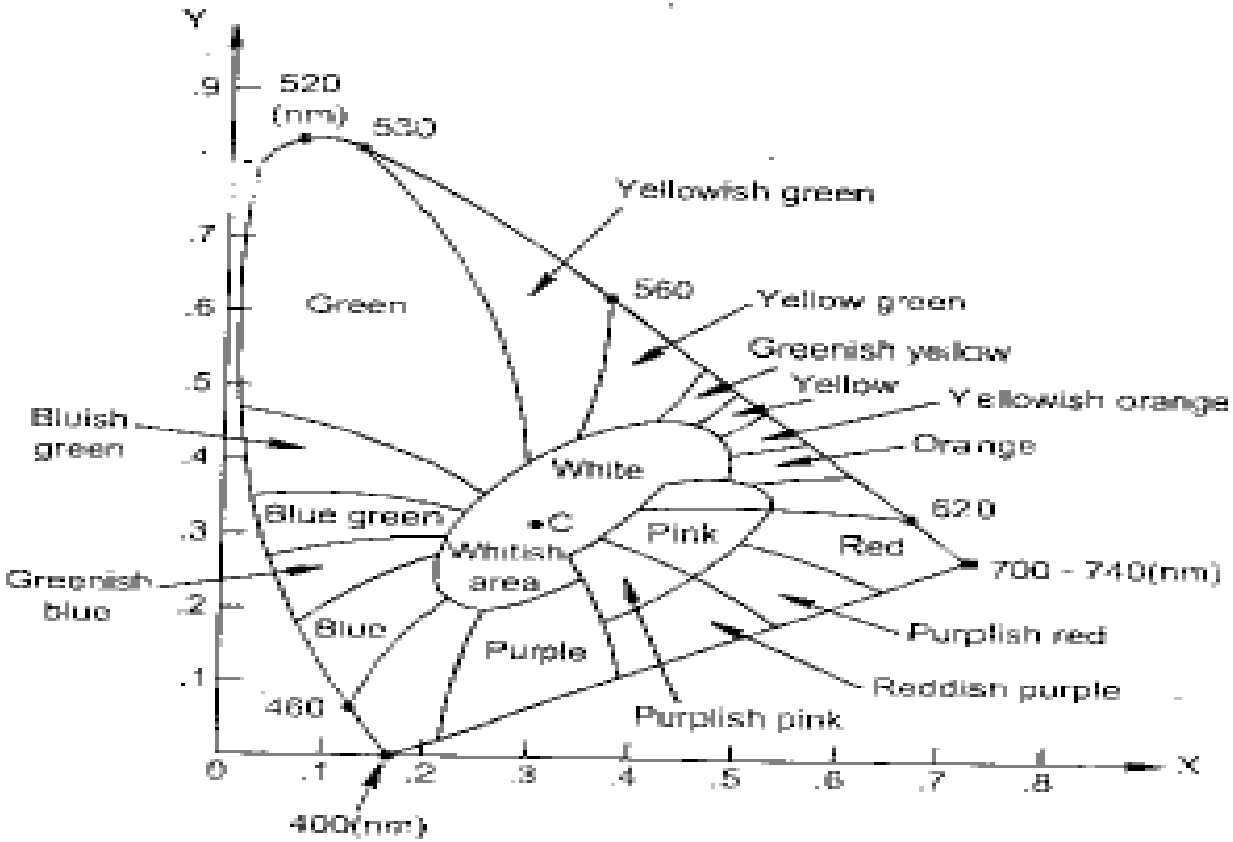
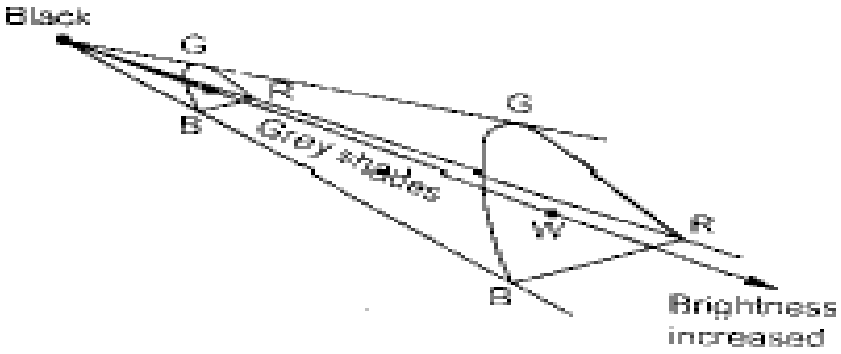


Fig.1.18(a) Chromaticity diagram.



ADVANTAGES:

Using this diagram we can identify the color obtained by additive mixing process. If bright increases, Z axis also increase and chrominance diagram becomes enlarged in 3D representation.

LUMINANCE, HUE AND SATURATION

All the colours are having the following three characteristics. 1. Hue, 2. Saturation, 3.Luminance.

LUMINANCE:

It is the amount of light intensity as perceived by the eye regardless of the colour. It is also called as brightness signal, y signal, and white signal.

HUE (TINT)

It is the predominant spectral colour. For example, green leaf has a green hue and red apple has red hue.

SATURATION:

It will indicate the spectral purify of colour. i.e., it will indicate how much white mixed with a particular colour.

CHROMINANCE:

Hue and Saturation together are called as chrominance or chroma signal.

THANK YOU