The Hubble Constant is Variable

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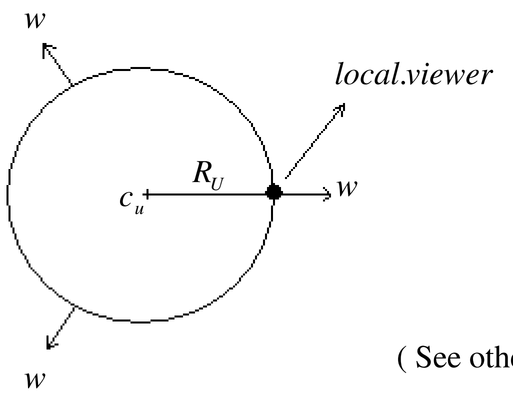
Introduction - According to several observations and measures the Hubble constant has different values. Those variations can't be explained by the errors of the different methods used to measure that value. Our hypothesis explains that the Hubble constant must change value with the angle of observation, from the direction of the centre of the universe, and with the distance because that centre exists and we are not on it.

Formulas of our universe

Hypothesis one – The centre of the universe exists and the universal expansion is a particular case of electromagnetic propagation from that centre.



$$w = c^2 \frac{w_0 + V}{c^2 + V w_0}$$

(See other articles of the author – www.wbabin.net)

$$M_U w_o^{\ 2} = h.f_M \quad ; \quad f_M = \frac{c}{\sqrt{k}} = 4.822251 \times 10^{21} Hz \quad \text{(Matter frequency)}$$

c -- light speed ; h -- Planck's constant ; $i\sqrt{k} =$ neutrino's wavelength ;
$w_0 =$ reference propagation speed ; M_U = local universe mass.

As M_U is very high w_0 is very low, so:

$$w = V \quad \text{and} \quad V = \sqrt{\frac{2GM_U}{R_U}}$$

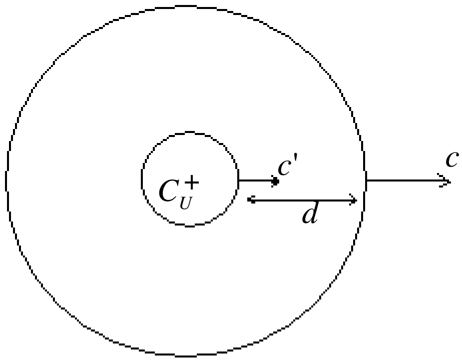
According to several theories and calculations $V = c \quad \Leftrightarrow$

$$\Leftrightarrow \quad c^2 = \frac{2GM_U}{R_U} \quad \text{(Formula one)}$$

The absolute speed of the local expansion, related to the centre of our universe, is equal to the light speed.

The local viewer is living at the surface of a black hole that expands at the escape speed *c*. All the points of the universe obey to that condition.

Hubble formula



$$v = H_0 d$$

$$v = c - c'$$

$$c = \sqrt{\frac{2GM_U}{R_U}} \qquad c' = \sqrt{\frac{2GM_U'}{R_U'}}$$

Hypothesis two – The density of the universe is constant

$$\rho_U = \frac{M_U}{4\pi R_U^{\,3}/3} = \frac{M_U'}{4\pi R_U'^{3}/3} \quad \Leftrightarrow \quad M_U' = \frac{M_U R_U'^{3}}{R_U^{\,3}}$$

$$v = \sqrt{\frac{2GM_U}{R_U}}\left(\frac{R_U - R_U'}{R_U}\right) \quad \text{and} \quad R_U - R_U' = d \quad \Leftrightarrow$$

$$\Leftrightarrow \quad v = \sqrt{\frac{2GM_U}{R_U^{\,3}}}\,d \quad \text{and} \quad v = H_0 d \quad \Leftrightarrow$$

$$H_0 = \sqrt{\frac{2GM_U}{R_U^{\,3}}} \quad \text{(Formula two)} \quad ; \quad H_0 \approx 2.372\times10^{-18}\,Hz = 73.2\,Km/s/Mpc$$

$$\text{and} \quad c^2 = \frac{2GM_U}{R_U} \quad \Leftrightarrow \quad R_U = \frac{c}{H_0} \quad \Leftrightarrow \quad \underline{R_U = 1.263881\times10^{26}\,m}$$

R_U -- local universe radius ; M_U -- local universe mass

$$M_U = \frac{c^3}{2GH_0} \quad \Leftrightarrow \quad \underline{M_U = 8.509777\times10^{52}\,Kg}$$

Hypothesis three – The universal expansion is a uniform accelerated movement with initial speed equal to zero.

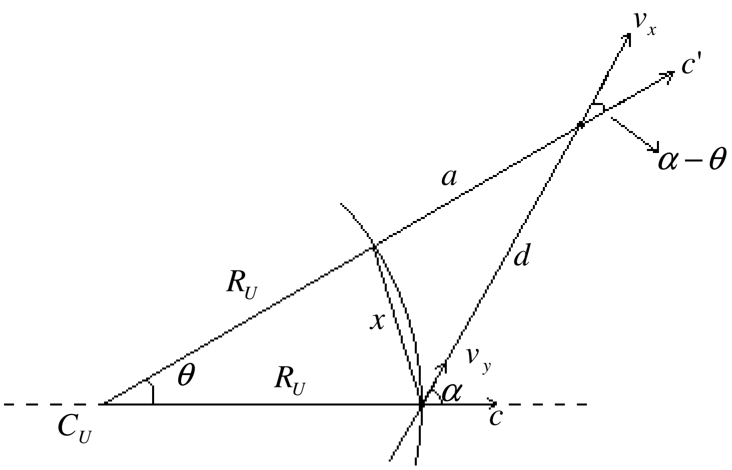
$$\Leftrightarrow \quad R_U = \frac{c}{2}T_U \quad \Leftrightarrow \quad T_U = \frac{2}{H_0} \quad ; \quad \text{Age of the universe -- } \underline{T_U = 8.431703\times10^{17}\,s}$$

Acceleration of the universe -- $g_U = \frac{GM_U}{R_U^{\ 2}} \quad \Leftrightarrow \quad g_U = \frac{cH_0}{2}$

$$\underline{g_U = 3.555538 \times 10^{-10}} \qquad (\ g_U = 5.327G \ )$$

Just checking: $R_U = \frac{1}{2} g_U T_U^{\ 2} \quad \Leftrightarrow \quad R_U = 1.263881 \times 10^{26} m$

Derivation of the local expansion formula



$$c = \sqrt{\frac{2GM_U}{R_U}}$$

$$c' = \sqrt{\frac{2GM_U'}{R_U'}}$$

$$v_x = c'\cos(\alpha - \theta) \quad ; \quad v_y = c\cos\alpha \quad ; \quad v = v_x - v_y$$

$$H = \frac{v}{d} = \frac{c'\cos(\alpha - \theta) - c\cos\alpha}{d}$$

$$\begin{cases} x^2 = 2R_U^{\ 2} - 2R_U^{\ 2}\cos\theta \\ \dfrac{x}{\sin(\alpha - \theta)} = \dfrac{d}{\cos(\theta/2)} \end{cases} \quad \Leftrightarrow \quad tg\theta = \frac{d\sin\alpha}{R_U - d\cos\alpha}$$

$$\frac{a}{\cos(\theta/2 - \alpha)} = \frac{d}{\cos(\theta/2)} \quad \Leftrightarrow \quad a = \frac{d\cos(\theta/2 - \alpha)}{\cos(\theta/2)}$$

$$R_U' = R_U + a \qquad \text{and} \qquad M_U' = M_U \frac{R_U'^3}{R_U^{\ 3}}$$

$$M_U' = M_U \frac{(R_U + a)^3}{R_U^{\ 3}} \quad \Leftrightarrow \quad c' = \sqrt{\frac{2GM_U (R_U + a)^2}{R_U^{\ 3}}} \quad \Leftrightarrow \quad c' = c\frac{R_U + a}{R_U}$$

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SCREEN 2
pi = 3.14159265
c =  3 E + 8
Ru = 1.26388 E + 26
d = 1.26 E + 26      (   almost Ru for a maximum variation of H  )
x = 0     (  to 360  )
alfa = x * pi / 180
teta =ATN ( d * SIN ( alfa ) / ( Ru – d * COS ( alfa ) ) )
a = d * COS ( teta / 2 – alfa ) / COS ( teta / 2 )
cl = c * ( Ru + a ) / Ru
H = ( cl * COS ( alfa – teta ) – c * COS ( alfa ) ) / d
PRINT H
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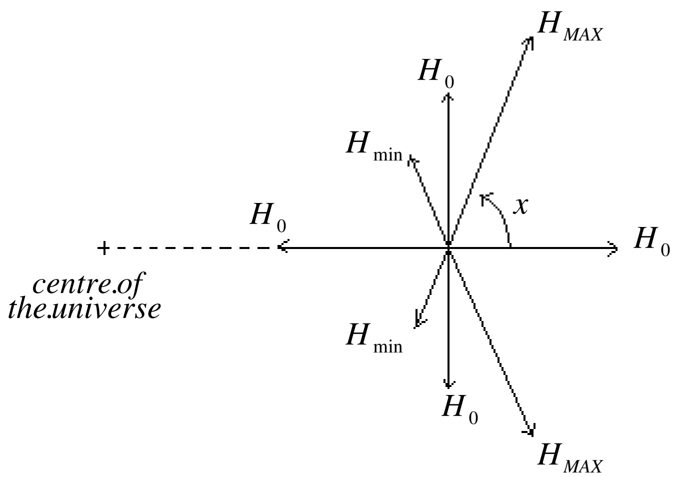
Angular variation of the Hubble constant

x = 0 , 90 , 180 , 270 ⇔ $H_0 = 2.373\times10^{-18}\,Hz =$ <u>73.2</u> Km/s/Mpc

x = ± 54.3 ⇔ $H_{MAX} = 3.496\times10^{-18} =$ <u>107.8</u>

x = ± 124.9 ⇔ $H_{\min} = 1.1671\times10^{-18} =$ <u>34.0</u>



If we know the celestial coordinates and the distance of the objects that we have measured the Hubble constant, we can test this hypothesis. We just need to analyse the already existent data.