**Ultimate fate of universe**



**D**=distant galaxy **S**=sun.(center of solar system). **R**=Radius of elliptical orbit in which earth moves around the sun. **A** and **B** are the position of earth at different instants of time respectively . **d1**=distance between sun and distant galaxy . **d**=distance between earth and distant galaxy . **θ** =angle between d1 and d respectively. From triangle SDB , **tan θ=R/ d1** i.e **d1=R / tan θ** By appyling law of **Pythogarous theorm** to triangle SDB we get **BD^2=DS^2+ SB^2 BD= d, DS= d1, SB= R** i.e **d ^2= d1^2+ R ^2 (As d1=R / tan θ** ) Then the equation  **d ^2= d1^2+ R ^2** becomes **d ^2= R ^2 /tan^2 θ**  **+ R ^2 d ^2= R ^2(1 /tan^2 θ**  **+ 1)**  ,as (**1 /tan^2 θ**  **+ 1= cosec^2** **θ** ) The equation **d ^2= R ^2(1 /tan^2 θ**  **+ 1)**  becomes **d ^2= R ^2** **cosec^2** **θ** i.e **d = R**  **cosec** **θ** is obtained. According to **Hubble law:** Greater is the distance of distant galaxy from the earth(observor on earth) ,greater is the velocity with which distant galaxy moving away from the earth (observor on earth) Hence mathematically represented by the equation **v=H d** where **H**=present Hubble constant ( which is the function of time) . **v**= velocity with which distant galaxy moving away from the earth (observor on earth) . **d**= distance of distant galaxy from the earth. As **d = R cosec** **θ** then the equation **v=H d** becomes **v=H R**  **cosec** **θ** is obtained **.** Let us divide the above equation **v=H R cosec** **θ** by **c** where **c=** speed of light in vaccum (3\*10^8 m/s) Then we get **v/c=H R**  **cosec** **θ** **/c** is obtained.

If a source of the light is moving away from an observer, then red shift (z > 0) occurs; if the source moves towards the observer, then [blue shift](http://en.wikipedia.org/wiki/Blue_shift) (z < 0) occurs. This is true for all electromagnetic waves and is explained by the [Doppler effect](http://en.wikipedia.org/wiki/Doppler_effect). Consequently, this type of red shift is called the Doppler red shift. If the source moves away from the observer with [velocity](http://en.wikipedia.org/wiki/Velocity) v, which is much less than the speed of light (v << c), the red shift is given by

    (Since , [see below](http://en.wikipedia.org/wiki/Redshift#Relativistic_Doppler_effect))



where c is the [speed of light](http://en.wikipedia.org/wiki/Speed_of_light)in vaccum.

i.e **v/c = Z**  (where **Z=**Red shift) i.e **Z=** **H R**  **cosec** **θ** **/c** is obtained Another application of the z parameter is to imply the [scale factor](http://hyperphysics.phy-astr.gsu.edu/Hbase/astro/expuni.html#c1) R of the universe at the time that light was emitted from a given observed galaxy The z parameter is related to R by the expression **1+Z=λ Observed / λ emitted = R0 /R = 1/R .** where the present scale factor of universe is taken as **R0 =1** . The z parameter can also be used to assess the mass density compared to them mass density **ρ0** at the present time. **ρ = ρ0 / R^3 ,** we know density of universe vary with time where **ρ0** = present mass density of universe**, ρ=** later mass density of universe which vary with respect to time (t) As **1+Z = 1/R ,** Cubing of equation **1+Z = 1/R** we get **( 1+Z)^3 = 1/R^3.** The equation **ρ = ρ0 / R^3** becomes **ρ / ρ0 = 1/ R^3** i.e **ρ / ρ0 =** **( 1+Z)^3** is obtained. (**ρ / ρ0 ) 1/3 =** **( 1+Z) ,** as ( **Z=** **H R**  **cosec** **θ** **/c )** Equation **(ρ / ρ0 ) 1/3 =** **( 1+Z)** becomes **(ρ / ρ0 ) 1/3 =** **( 1+ H R**  **cosec** **θ** **/c)**  **(ρ / ρ0 ) 1/3 c =** **( c + H R**  **cosec** **θ** **) . H R cosec** **θ** = **(ρ / ρ0 ) 1/3 c - c** . **H R cosec θ = c [ (ρ / ρ0 ) 1/3 - 1] i.e R = c/ H cosec** **θ [ (ρ / ρ0 ) 1/3 - 1].**  Where **R**=Radius of elliptical orbit in which earth moves around the sun. **c=** speed of light in vaccum (3\*10^8m/s) **H**=present Hubble constant ( which is the function of time) **ρ0** = present mass density of universe. **ρ=** later mass density of universe which vary with respect to time (t) i.e with Z ( red shift). **θ** =angle between d1 and d respectively . By taking the the ratio **(ρ / ρ0 ) =1** Hence **Density of universe remains constant** then **R = c/ Hcosec** **θ [ (1) 1/3 - 1]. R = c/ H cosec** **θ [1 - 1]** Since **(1) 1/3 = 1** (cube root of 1 is 1) **.** i.e **R = c/ H cosec** **θ [0]** then **R= 0 .** Hence Radius of elliptical orbit in which earth moves around the sun is **zero** i.e **R=0** According to **Newton’s universal law of gravitation F=GM m/ R^2** i.e **(F*a*1/R^2)**  As R= 0 .i.e  **F*a*1/0** then **F**= infinity**( ∞)**  **Result :** When **(ρ / ρ0 ) =1 (density of universe remains constant ),** then earth will be collapsed to sun since gravitational force of attraction of sun is ∞ .

**Proof for the equation ρ = ρ0 / R^3**

### Please refer [Doppler Redshift](http://www.google.co.in/url?sa=t&source=web&ct=res&cd=3&ved=0CBYQFjAC&url=http%3A%2F%2Fhyperphysics.phy-astr.gsu.edu%2FHbase%2Fastro%2Fredshf.html&ei=OcdfS4ndI4GI6gPa6YS1DA&usg=AFQjCNHX0VENRoBJDkO7yZjKqz855GqqfA&sig2=oio7fggBOP1Pu9LccVjY_w) ( Google search )

At such large values of z, the redshift is mainly the cosmological redshift, and not a valid measure of the actual recessional velocity of the object with **...**  
hyperphysics.phy-astr.gsu.edu/Hbase/astro/redshf.html - [Cached](http://74.125.153.132/search?q=cache:0tBn3OKNHd8J:hyperphysics.phy-astr.gsu.edu/Hbase/astro/redshf.html+doppler+redshift&cd=3&hl=en&ct=clnk&gl=in&client=firefox-a) - [Similar](http://www.google.co.in/search?hl=en&client=firefox-a&rls=org.mozilla:en-US:official&hs=9nf&q=related:hyperphysics.phy-astr.gsu.edu/Hbase/astro/redshf.html+doppler+redshift&sa=X&ei=OcdfS4ndI4GI6gPa6YS1DA&ved=0CBcQHzAC) -