Thus, since the other components of \( \mathbf{a} \) vanish by symmetry:

\[
\frac{d}{dr} = \mathbf{a}
\]

and we can read off the constant \( A' \).
In other words, the quantity in square brackets, which we have labeled \( I \), must be constant if the cylinder is not subjected to any external forces. Thus, the expression can be rewritten as

\[ 0 = \frac{d}{dt} \left( -\frac{p}{\epsilon} + \frac{\rho}{I} \right) \]

and

\[ \frac{d}{dt} \left( \frac{\rho}{I} \right) = \frac{p}{\epsilon} \]

(c) Finding the differential equation by \( \phi \), substitute equation (2) into the differential equation found in (c), we find

\[ \frac{d}{dt} \left( \frac{\rho}{I} \right) = \frac{p}{\epsilon} \]

and then

\[ \rho = \frac{p}{\epsilon} I \]

(d) Since \( \rho \) and \( I \) are functions of time, the solution satisfies the differential equation.

(e) The function \( t \) is determined by the differential equation that is obeyed.
Problem 2: Energy and the Friedman Equation

(1) We are given the connected quantity

\[
\frac{\rho \rho}{\varepsilon} = \rho
\]

Problem 2: A Flat Universe with Unusual Time Evolution

(2) For the Friedman equation, the absence of a static solution was

\[
\frac{\rho \rho}{\varepsilon} = \rho H
\]

(3) The energy density \( \rho \) of a particle or a parcel of mass in a certain

\[
\rho = \frac{\rho \rho}{\varepsilon} H
\]

\[
\frac{\rho \rho}{\varepsilon} \frac{\rho \rho}{\varepsilon} = \rho H
\]

(4) The calculation of the Hubble expansion rate is a straightforward application

\[
\int \frac{\rho \rho}{\varepsilon} d\tau = \rho
\]

\[
\frac{\rho \rho}{\varepsilon} \frac{\rho \rho}{\varepsilon} = \rho H
\]
The infinitesimal quantity \( dp \), you will find Eq. (9).

\[
\frac{d}{wp (\lambda) W} - \int \frac{d}{wp (\lambda) W} = \int \phi
\]

is given by Eq. (11). By the change in the potential energy, we now add a shell of radius \( a \) and thickness \( dp \), so the mass of the shell is

\[
\int \phi \frac{d}{wp (\lambda) W} = (\lambda) W
\]

To assemble the sphere shell \( \frac{2}{\pi} \) we consider some fixed time \( t \), so the

\[
\tau \sum \frac{2}{\pi} W = \mathcal{M}
\]

which is the formula that we are asked to show, with

\[
\int \phi \tau \sum \frac{2}{\pi} W \frac{2}{\pi} = \mathcal{M}
\]

where \( \tau \sum \frac{2}{\pi} W \) is the mass of the particle (measured from the center of the sphere).

\[
\int \tau \sum \frac{2}{\pi} W \frac{2}{\pi} = \mathcal{M}
\]

where \( \int \tau \sum \frac{2}{\pi} W \frac{2}{\pi} = \mathcal{M} \) is the mass.

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where \( \int \tau \sum \frac{2}{\pi} W \frac{2}{\pi} = \mathcal{M} \) is the mass.

\[
\int \tau \sum \frac{2}{\pi} W \frac{2}{\pi} = \mathcal{M}
\]

where \( \int \tau \sum \frac{2}{\pi} W \frac{2}{\pi} = \mathcal{M} \) is the mass.
\[
\frac{z^p}{\varphi} = \eta
\]

One can use the conceptually derived quantity

\[
\eta = z^q \left( \frac{p}{\varphi} \right) - \frac{p^q}{\varphi} - \left( \frac{p}{\varphi} \right) \frac{z}{\varphi}
\]

Because the constant, we will call this constant \( \eta \), the quantity inside the curly brackets must be constant. Following the above, we have

\[
0 = \left\{ \frac{p^q}{\varphi^2} - \frac{p^q}{\varphi^2} - \left( \frac{p}{\varphi} \right) \frac{z}{\varphi} \right\} \frac{p}{\varphi}
\]

which can be rewritten as

\[
\frac{p}{\varphi} \left\{ \eta \frac{p}{\varphi} - \frac{p^q}{\varphi^2} - \left( \frac{p}{\varphi} \right) \frac{z}{\varphi} \right\} = \frac{p}{\varphi} \frac{p}{\varphi} - \eta \frac{p^q}{\varphi^2}
\]

Multiplying the equation by \( p/\varphi \), we get

\[
\frac{p}{\varphi} + \frac{p^q}{\varphi^2} - \left( \frac{p}{\varphi} \right) \frac{z}{\varphi} = \eta
\]

The value of \( \eta \) is determined in part (b). For \( \eta \), we let the differential equation obtained in part (a) for \( \eta \) should obey the differential equation obtained in part (a) for \( \eta \).

\[ H = \eta \]

Dividing these equations by \( \eta \), one has the initial conditions

\[
\begin{align*}
\eta(0) &= \eta(0) \\
\eta'(0) &= \eta(0)
\end{align*}
\]

(c) This is exactly the same as the case discussed in the lecture notes since the initial conditions do not depend on the differential equation. If \( \eta = 0 \), the system is exactly the same as the case discussed in the lecture notes, since the initial conditions are not.

Now, the closed form of an equation is obtained in the last term, which is proportional to \( \eta \).

Substituting \( \eta = 0 \), this becomes

\[
\frac{1}{u^2} \frac{u^2}{\varphi} + \frac{p^q}{\varphi} = \frac{1}{u^2}
\]

Dividing both sides of the equation by \( u^2 \), one has

\[
\frac{1}{u^2} \frac{u^2}{\varphi} + \frac{p^q}{\varphi} = \frac{1}{u^2}
\]

Substituting the equation for \( t \), given on the graph, one finds

(a) Solution of the equation (b) given on the graph, into the differential equation for \( t \).

Problem 4: A Possible Modification of Newton's Law of Gravity

The conceptually derived quantity \( F \) is

\[
F = \frac{G}{r^2}
\]

The local gravity of the expanding sphere is derived equal to a constant times

\[
F = \frac{G}{r^2} = \frac{G}{(r + \frac{c}{2})^2} = \frac{G}{r^2 + \frac{2c}{r} + \frac{c^2}{4}}
\]

Thus,

\[
F = \frac{G}{r^2 + \frac{2c}{r} + \frac{c^2}{4}}
\]

which is what we wanted to show, with

\[
\mathbf{r} = \frac{c}{2}
\]

where in the last step we used Eq. (1) and (i) to express \( r \) in spherical coordinates.

In terms of local potentials, we integrate over \( r \) to get

\[
\int_0^r \frac{G}{r^2 + \frac{2c}{r} + \frac{c^2}{4}} \, \mathrm{d}r = \omega
\]
\[
\frac{\mathcal{V}^{\mu 8}}{\epsilon^{2\nu}} = -\kappa \rho
\]

constant A by

can see that the mass density of the vacuum is related to Einstein's cosmological constant is taken to be zero. From the above equality, we can

where shows that the cosmological constant contributes like a constant addition

\[
\epsilon^{\nu} \left( \frac{\mathcal{V}^{\mu 8}}{\epsilon^{2\nu}} + \delta \right) \frac{\delta}{\delta \mathcal{V}^{\mu 8}} = \left( \frac{\nu}{\rho} \right)
\]

The differential equation can be rewritten as

\[
\frac{\mathcal{V}^{\mu 8}}{\epsilon^{2\nu}} = \mathcal{L}
\]

\[\text{By Einstein, is added to } \mathcal{L} \]

built a static model of the universe. The cosmological constant was named by Albert Einstein in 1917 in an effort to

Additionally note: Historically, the constant \( \mathcal{L} \) is the cosmological constant. The cosmological constant corresponds to the cosmological constant

where I have used

\[
\frac{\epsilon^{\nu}}{\epsilon^{2\nu}} \mathcal{L} + \delta \frac{\mathcal{V}^{\mu 8}}{\epsilon^{2\nu}} = \left( \frac{\nu}{\rho} \right)
\]

One can then rewrite the equation in the more standard form

\[
\frac{\zeta}{\epsilon^{2\nu}} = \left\{ \epsilon^{\nu} \left( \frac{\epsilon^{\nu}}{\epsilon^{2\nu}} \mathcal{L} - \frac{\mathcal{V}^{\mu 8}}{\epsilon^{2\nu}} \right) - \left( \frac{\rho}{\epsilon^{\nu}} \right) \frac{\zeta}{\epsilon^{2\nu}} \right\}
\]

in which case the equation can be written

\[p. 11\]