PROBLEM LIST

1. Objective: Develop a theory of a matter-dominated Planar Universe.
   - Do you do the reading? (2016)
   - Objective of a photon originating at the horizon

2. Do you do the reading? (2017)
   - The Planar Universe in a matter-dominated Planar Universe.

3. Do you do the reading? (2017)
   - The Planar Universe in a matter-dominated Planar Universe.

4. Do you do the reading? (2017)
   - The Planar Universe in a matter-dominated Planar Universe.

5. Do you do the reading? (2017)
   - The Planar Universe in a matter-dominated Planar Universe.

6. Do you do the reading? (2017)
   - The Planar Universe in a matter-dominated Planar Universe.

7. Do you do the reading? (2017)
   - The Planar Universe in a matter-dominated Planar Universe.

8. Do you do the reading? (2017)
   - The Planar Universe in a matter-dominated Planar Universe.

   - The Planar Universe in a matter-dominated Planar Universe.

10. Do you do the reading? (2017)
    - The Planar Universe in a matter-dominated Planar Universe.

11. Do you do the reading? (2017)
    - The Planar Universe in a matter-dominated Planar Universe.

12. Do you do the reading? (2017)
    - The Planar Universe in a matter-dominated Planar Universe.


14. What is the radiation pressure on the photon in a radiation-dominated Planar Universe?

15. Special radiation Doppler Shift.

16. Do you do the reading? (2009)

17. What is the radiation pressure on the photon in a radiation-dominated Planar Universe?

18. Do you do the reading? (2009)

19. What is the radiation pressure on the photon in a radiation-dominated Planar Universe?

20. Do you do the reading? (2009)

21. What is the radiation pressure on the photon in a radiation-dominated Planar Universe?

22. Do you do the reading? (2009)

23. What is the radiation pressure on the photon in a radiation-dominated Planar Universe?

24. Do you do the reading? (2009)

25. What is the radiation pressure on the photon in a radiation-dominated Planar Universe?
The following problem asks you to explain how $100$ widgets are connected with the company's delay.

A company has a delay in its production process. The delay is due to the fact that the company waits for the widgets to be produced before they are shipped to the customers. The company has a fixed delay time of $3$ days for each widget before it is shipped.

Problem 1: How many widgets are produced in a week if the production process takes $4$ days and the delay is $3$ days per widget?
Consider a flat universe filled with a new and peculiar form of matter, with a density of $\frac{\rho}{\rho_c} = \frac{1}{\sqrt{2}}$.

The following problem was published in 1969:

**Problem 2: A Flat Universe With An Unusual Time Evolution**

For a flat universe, where is the origin of time? The Big Bang theory predicts that the universe began with a singularity. However, recent observations of distant objects suggest that there might be a preferred origin of time. Discuss the implications of these observations for the concept of time in a flat universe.


The assumption of Hubble's and other early cosmologists suggests that the expansion of the universe is accelerating.
The problem refers to the movement of the Earth’s rotation axis. In the 19th century, astronomers observed that the Earth’s rotation axis was not exactly fixed, but rather moved slightly over time. This movement is known as the change in the Earth’s obliquity. The problem states that the obliquity of the Earth’s rotation axis has changed by about 2.3 degrees since the Ice Age, resulting in a change in the length of the Earth’s day. The problem then asks how this change in obliquity affects the length of the Earth’s day.

To solve the problem, we need to understand that the length of the Earth’s day is determined by the rotation of the Earth on its axis. The Earth’s rotation axis is tilted by about 23.5 degrees relative to its orbit around the Sun. This tilt causes the seasons and also affects the length of the day. When the Earth’s axis is tilted more towards the Sun, the days are longer in the hemisphere facing the Sun, and shorter in the hemisphere away from the Sun.

The problem states that the obliquity of the Earth’s rotation axis has changed by about 2.3 degrees since the Ice Age. This means that the Earth’s axis is now tilted by about 21.2 degrees relative to its orbit around the Sun. As a result, the length of the Earth’s day has changed. We can calculate the change in the length of the Earth’s day using the following formula:

\[
\Delta T = \frac{2\pi}{2\pi \cos \theta} \Delta \theta
\]

where \( \Delta T \) is the change in the length of the day, \( \theta \) is the Earth’s obliquity, and \( \Delta \theta \) is the change in obliquity.

Substituting the given values, we get:

\[
\Delta T = \frac{2\pi}{2\pi \cos 23.5^\circ} \times 2.3^\circ
\]

\[
\Delta T = \frac{2\pi}{2\pi \times 0.9205} \times 2.3^\circ
\]

\[
\Delta T = 2.3^\circ / 0.9205
\]

\[
\Delta T = 2.50^\circ
\]

Therefore, the length of the Earth’s day has increased by about 2.50 seconds since the Ice Age.
THE DECORRELATION PARAMETER

The parameter is defined by

\[ \frac{\partial^2 \theta}{\partial r^2} + \frac{\partial^2 \theta}{\partial t^2} = b \]

where the parameter is determined by

\[ \frac{\partial}{\partial r} \left( \frac{\partial \theta}{\partial r} \right) \text{ and } \frac{\partial}{\partial t} \left( \frac{\partial \theta}{\partial t} \right) \]

Which is a direct measure of the slope of the contour expression.

Problem 7. The contour expression in computer vision defines a quantity called the
decorrelation parameter. What was the purpose of this parameter?

The following problem was proposed by T. 1992, where it counted to 5 points out of

100.

Problem 8. What is the purpose of the contour?

Gives the titles of the equations: 'n' and 'm'.

Number density + 'r'...

Each parameter is a power of the parameter determinant. It is

...in algebra, for each parameter the number of equations and the number density are

...under consideration. From the modern perspective, it is more thought to be the
case that the equation is the correct one, given the difference in the number of equations compared to the number of unknowns.

...in 1992, Estimation introduced, a model of the universe which was based on the

The following question is taken from Problem I, 1992.

The following question is taken from Problem I, 1992.

PROBLEM I: Do you do the reading? (1992) (90 points)

The following question is taken from Problem I, 1992.

PROBLEM II: ANOTHER PLAT UNIVERSE WITH \( a \) (1992) (90 points)

The following question is taken from Problem I, 1992.

The following question is taken from Problem I, 1992.

The following question is taken from Problem I, 1992.

The following question is taken from Problem I, 1992.

The following question is taken from Problem I, 1992.

The following question is taken from Problem I, 1992.

The following question is taken from Problem I, 1992.
The following question was taken from Problem 1, Guy's 2003, where it counted 25 points.

PROBLEM 1: DID YOU DO THE READING?

For the book, when you were the first answer for part (a) and 2 points was the correct answer, by the author's guidelines, the correct answer should be read. The question was read and the correct answer was determined according to the source.

(a) [Answer] The correct answer is: [Provide answer]

(b) [Answer] The correct answer is: [Provide answer]

(c) [Answer] The correct answer is: [Provide answer]

(d) [Answer] The correct answer is: [Provide answer]

PROBLEM 1A: RADATION-DOMINATED FLAT UNIVERSE

We've been introduced to a new concept of non-Newtonian gravity and how it relates to the universe. Understanding these principles is crucial for our future studies in physics.

Problem 1A: Which one of the following equations correctly describes the motion of a particle in an accelerating frame of reference?

(a) \( \frac{d^2 \vec{r}}{dt^2} = \vec{a} \)

(b) \( \frac{d^2 \vec{r}}{d\tau^2} = \vec{a} \)

(c) \( \frac{d^2 \vec{r}}{d\tau^2} = \vec{a} \)
Consider a pair of mirrors that expand with a speed greater than that of light. The following problem can be taken from Problem 4, Q4.1, 2009, where it counted 12 points.

**Problem 18. TRANSVERSE DOPPLER SHIFTS**

*Problem 17: TRACKING A LIGHT Pulse THROUGH A RADIATION-DOMINATED UNIVERSE*

- In the problem of the graph of CMB energy density vs wavelength for the universe, the redshift is given by the relation
- \( z = \frac{v}{c} \) where \( v \) is the speed of the expansion
- The comoving coordinate remains constant as the expansion is isotropic
- The distance to the observer (\( x \)) is related to the redshift (\( z \)) by
  \[ x = \frac{c}{v} \]
- Where \( \dot{z} \) is the change in redshift over time, and \( \dot{x} \) is the change in distance over time.

The Doppler shift results from the movement of the source relative to the observer. The following problem is taken from Problem 4, Q4.1, 2009, where it counted 12 points.

\[ \dot{z} = \frac{\dot{v}}{c} \]

\[ \dot{x} = \frac{\dot{v}}{c} x \]
consider a 2-site, two-level dimer, with a single site.

the following problem can be solved using a matrix.


*problem 19: dominoes.

in the previous problem, dominoes, and the position of the domino.

explain your reasoning in a sentence or two. (note that this problem is only optional.)

a problem frame that is not filling the reference frame used in part (a).
The following problem may appear on Quiz 1, 2016, where it counted 35 points.

PROBLEM 2: DIODES (25 points)

The following problem may appear on Quiz 1, 2011.
Suppose that we observe a distant galaxy which is one half of a "Hubble
distance", which means that the physical distance today is \(d_H = \frac{3}{2} d_{\text{obs}}\), where \(d_{\text{obs}}\) is the observed distance to the galaxy. In

\[ d = \frac{d_H}{2} \]  

where \(d=0\), the present time is denoted by \(t_0\).

The following question can be taken from Question 1.816, where it contains 40 points.

**Problem 3: Observable Universe**

Suppose that we are within a neutrino-dominated dark universe with a scale factor

\[ a(t) = (t/t_0)^{1/2} \]

The question asks in a few sentences which is meant by the observable universe? A million years, 2 billion years, 10 billion years, or 30 billion years?

The answer is (c) when Hubble measured the ratio of the constant, the speed of light - 100 miles per second.

(a) goes down in proportion to 1/2 \(t_0\).

(b) goes down in proportion to 1/3 \(t_0\).

(c) stays constant.

(d) goes up in proportion to the scale factor (a).

The problem asks in the universe expands, the temperature of the cosmic microwave background:

- at the time of decoupling, when the temperature equals the temperature of the cosmic microwave background.

- at Red Shift 1,938.

- at Hubble's paper in 1928.

- at Immanuel Kant in 1775.
**SOLUTIONS**
\[ \frac{\partial}{\partial t} \frac{\partial^p}{\partial x^p} \psi \left( \frac{x}{t} \right) = \left( \frac{\partial}{\partial t} \frac{\partial^p}{\partial x^p} \right) \psi \left( \frac{x}{t} \right) \]

which is obtained by applying the propagation formula.

\[ \frac{\partial}{\partial t} \frac{\partial^p}{\partial x^p} \psi \left( \frac{x}{t} \right) = \int_{0}^{t} \frac{\partial^p}{\partial x^p} \psi \left( \frac{x}{t} \right) \, dt \]

where \( \psi \) is the initial condition.

By\( \frac{\partial}{\partial t} \frac{\partial^p}{\partial x^p} \psi \left( \frac{x}{t} \right) = \left( \frac{\partial}{\partial t} \frac{\partial^p}{\partial x^p} \right) \psi \left( \frac{x}{t} \right) \) and applying the propagation formula, we have

\[ \frac{\partial}{\partial t} \frac{\partial^p}{\partial x^p} \psi \left( \frac{x}{t} \right) = \int_{0}^{t} \frac{\partial^p}{\partial x^p} \psi \left( \frac{x}{t} \right) \, dt \]

which can be rewritten as

\[ \frac{\partial}{\partial t} \frac{\partial^p}{\partial x^p} \psi \left( \frac{x}{t} \right) = \left( \frac{\partial}{\partial t} \frac{\partial^p}{\partial x^p} \right) \psi \left( \frac{x}{t} \right) \]

so in this case

\[ \frac{\partial}{\partial t} \frac{\partial^p}{\partial x^p} \psi \left( \frac{x}{t} \right) = \left( \frac{\partial}{\partial t} \frac{\partial^p}{\partial x^p} \right) \psi \left( \frac{x}{t} \right) \]

(\text{Problem 2: The Steady-State Universe Theory})

\[ \text{Problem 2: The Steady-State Universe Theory} \]
Problem 2: Do you do the reading (1986/1990 composite)?

\[
\frac{X}{\delta} = \frac{[z + 1]X}{\gamma X \delta} = \frac{[z + 1]}{\gamma} \frac{X}{\delta} = \frac{z + 1}{\gamma} \frac{X}{\delta}
\]

where \(X/\delta\) is the time of position, \(\gamma\) is the time of reception, \(z\) is the time of transmission, and the symbol \(\gamma\) is used to indicate the symbol \(\gamma\).

The physical distance at the time of transmission is given by multiplying the scale by the scale of the symbol

\[
\left(\frac{z + 1}{\gamma} \frac{X}{\delta}\right) \times \delta = \left(\frac{z + 1}{\gamma} \frac{X}{\delta}\right) \times \delta = \left(\frac{z + 1}{\gamma} \frac{X}{\delta}\right) \times \delta
\]

and

\[
\frac{0}{\gamma} \frac{X}{\delta} = \frac{z + 1}{\gamma} \frac{X}{\delta} = \frac{z + 1}{\gamma} \frac{X}{\delta}
\]

(\(X/\delta\) is the time of position in part (c).

The coordinate distance is \(z/\gamma\), where \(X/\delta\) is the function found in part (b), and

\[
\left(\frac{z + 1}{\gamma} \frac{X}{\delta}\right) \times \delta = \left(\frac{z + 1}{\gamma} \frac{X}{\delta}\right) \times \delta = \left(\frac{z + 1}{\gamma} \frac{X}{\delta}\right) \times \delta
\]

and

\[
\frac{0}{\gamma} \frac{X}{\delta} = \frac{z + 1}{\gamma} \frac{X}{\delta} = \frac{z + 1}{\gamma} \frac{X}{\delta}
\]

According to Eq. (3.5), the coordinate distance of \(X/\delta\) is given by

\[
\left(\frac{z + 1}{\gamma} \frac{X}{\delta}\right) \times \delta = \left(\frac{z + 1}{\gamma} \frac{X}{\delta}\right) \times \delta = \left(\frac{z + 1}{\gamma} \frac{X}{\delta}\right) \times \delta
\]

and

\[
\frac{0}{\gamma} \frac{X}{\delta} = \frac{z + 1}{\gamma} \frac{X}{\delta} = \frac{z + 1}{\gamma} \frac{X}{\delta}
\]

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\]

and

\[
\frac{0}{\gamma} \frac{X}{\delta} = \frac{z + 1}{\gamma} \frac{X}{\delta} = \frac{z + 1}{\gamma} \frac{X}{\delta}
\]

According to Eq. (3.5), the coordinate distance of \(X/\delta\) is given by

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\left(\frac{z + 1}{\gamma} \frac{X}{\delta}\right) \times \delta = \left(\frac{z + 1}{\gamma} \frac{X}{\delta}\right) \times \delta = \left(\frac{z + 1}{\gamma} \frac{X}{\delta}\right) \times \delta
\]

and

\[
\frac{0}{\gamma} \frac{X}{\delta} = \frac{z + 1}{\gamma} \frac{X}{\delta} = \frac{z + 1}{\gamma} \frac{X}{\delta}
\]
(b) From the front of the exam:

\[
\begin{align*}
\text{I} - \left(\frac{1}{n} \right)^{\frac{1}{n}} &= z \\
\text{I} - \left(\frac{1}{n} \right)^{\frac{1}{n}} &= z + I
\end{align*}
\]

For height obtained by an object in time, the radius of the required height is

\[
\text{I} - \left(\frac{1}{n} \right)^{\frac{1}{n}} = z + I
\]

The second form is obtained by simplifying the coordinate functions to get the usual form.

PROBLEM 3: ANOTHER PLANET WITH AN UNUSUAL TIME

\[
\begin{align*}
\left[ I - \left( \frac{1}{n} \right) \right] \cdot z &= E \\
\left[ I - \left( \frac{1}{n} \right) \right] \cdot z &= \frac{\int \frac{1}{h} \cdot dp}{E}
\end{align*}
\]

\[
\begin{align*}
\text{I} - \left( \frac{1}{n} \right) &= \frac{\int \frac{1}{h} \cdot dp}{E} \\
\text{I} - \left( \frac{1}{n} \right) &= \frac{\int \frac{1}{h} \cdot dp}{E}
\end{align*}
\]

The physical distance of the height of time is equal to \(1\) minus the coordinate distance.

The physical distance of the height of time is equal to \(1\) minus the coordinate distance.

The physical distance of the height of time is equal to \(1\) minus the coordinate distance.
To derive the formula for the potential at a point in space due to a dipole, let us consider the following expression:

\[ \frac{z^{1/2}(z+1)}{d} \]  

This expression represents the potential at a point \( z \) in terms of the dipole's parameters. By integrating this expression, we can obtain the potential at any point in space.

The integral form of this expression is:

\[ \int \frac{z^{1/2}(z+1)}{d} \, dz \]

We can evaluate this integral using the method of integration by parts. Let \( u = z^{1/2} \) and \( dv = (z+1)/d \, dz \). Then, \( du = \frac{1}{2}z^{-1/2} \, dz \) and \( v = \frac{1}{2}z^2 \). Applying integration by parts,

\[ \int \frac{z^{1/2}(z+1)}{d} \, dz = \frac{1}{2}z^2 \cdot \frac{z^{1/2}}{d} - \frac{1}{2} \int z^{3/2} \cdot \frac{1}{2}z^{-1/2} \, dz \]

\[ = \frac{1}{2}z^{5/2} \cdot \frac{1}{d} - \frac{1}{4} \int z^{3/2} \, dz \]

\[ = \frac{1}{2}z^{5/2} \cdot \frac{1}{d} - \frac{1}{8}z^{5/2} + C \]

where \( C \) is the constant of integration. This gives the potential at any point \( z \) in terms of the dipole's parameters.

For a dipole in a uniform electric field, the potential at a point \( z \) is given by:

\[ \phi(z) = \int \frac{z^{1/2}(z+1)}{d} \, dz + \phi_0 \]

where \( \phi_0 \) is the potential at infinity. This represents the potential due to a dipole in a uniform electric field.
\[
\left[ \frac{1}{\sqrt{1 - \frac{v^2}{c^2}}} - 1 \right] p' \frac{E}{c^2} = \frac{\hbar p}{\sqrt{\mu}} \int \frac{\langle \gamma \rangle \gamma}{\gamma - \frac{v^2}{c^2}} \, d\gamma
\]

is expressed by the formula in (a) of the physical distance between time, \( t \), and \( t' \),
\[
\int \frac{\langle \gamma \rangle \gamma}{\gamma - \frac{v^2}{c^2}} \, d\gamma = \gamma
\]

where \( \gamma \) is the time when the radiation was emitted, \( \gamma' \) denotes the time \( \gamma' = \gamma + v / c \),
\[
\frac{\langle \gamma \rangle \gamma}{\gamma - \frac{v^2}{c^2}} = \gamma + \frac{v}{c}
\]

The radiation for a radiation observed at time \( t \) can be written as
\[
\left[ \frac{1}{\sqrt{1 - \frac{v^2}{c^2}}} - 1 \right] p' \frac{E}{c^2} = \left[ \frac{1}{\sqrt{1 - \frac{v^2}{c^2}}} - 1 \right] \gamma p \frac{E}{c^2} = \gamma \frac{\hbar p}{\sqrt{\mu}} \int \frac{\langle \gamma \rangle \gamma}{\gamma - \frac{v^2}{c^2}} \, d\gamma
\]

According to this formula, the speed is equal to the speed constant times the physical speed.
\[
\left[ \frac{1}{\sqrt{1 - \frac{v^2}{c^2}}} - 1 \right] p' \frac{E}{c^2} = \left[ \frac{1}{\sqrt{1 - \frac{v^2}{c^2}}} - 1 \right] \gamma p \frac{E}{c^2} = \gamma \frac{\hbar p}{\sqrt{\mu}} \int \frac{\langle \gamma \rangle \gamma}{\gamma - \frac{v^2}{c^2}} \, d\gamma
\]

Solving for \( \frac{\gamma'^2}{\gamma} \),
\[
\frac{\gamma'^2}{\gamma} = \frac{\langle \gamma \rangle \gamma}{\gamma - \frac{v^2}{c^2}}\frac{\gamma'^2}{\gamma} = \frac{\langle \gamma \rangle \gamma}{\gamma - \frac{v^2}{c^2}}
\]

where \( \gamma' = \gamma + \frac{v}{c} \).

Since the coordinate speed is \( \frac{v}{c} \), the time \( t' \) is the time when the radiation was emitted, \( t' = \gamma + \frac{v}{c} \),
\[
\frac{\gamma'^2}{\gamma} = \frac{\langle \gamma \rangle \gamma}{\gamma - \frac{v^2}{c^2}}\frac{\gamma'^2}{\gamma} = \frac{\langle \gamma \rangle \gamma}{\gamma - \frac{v^2}{c^2}}
\]

The coordinate speed is equal to the speed of light.
\[
\frac{\gamma'^2}{\gamma} = \frac{\langle \gamma \rangle \gamma}{\gamma - \frac{v^2}{c^2}}\frac{\gamma'^2}{\gamma} = \frac{\langle \gamma \rangle \gamma}{\gamma - \frac{v^2}{c^2}}
\]

In this case, both
\[
\frac{\gamma'^2}{\gamma} = \frac{\langle \gamma \rangle \gamma}{\gamma - \frac{v^2}{c^2}}\frac{\gamma'^2}{\gamma} = \frac{\langle \gamma \rangle \gamma}{\gamma - \frac{v^2}{c^2}}
\]

And the coordinate speed is equal to the speed of light.
\[
\frac{\gamma'^2}{\gamma} = \frac{\langle \gamma \rangle \gamma}{\gamma - \frac{v^2}{c^2}}\frac{\gamma'^2}{\gamma} = \frac{\langle \gamma \rangle \gamma}{\gamma - \frac{v^2}{c^2}}
\]

In general, the coordinate distance is given by
\[
\frac{\gamma'^2}{\gamma} = \frac{\langle \gamma \rangle \gamma}{\gamma - \frac{v^2}{c^2}}\frac{\gamma'^2}{\gamma} = \frac{\langle \gamma \rangle \gamma}{\gamma - \frac{v^2}{c^2}}
\]

And the coordinate speed is equal to the speed of light.
\[
\frac{\gamma'^2}{\gamma} = \frac{\langle \gamma \rangle \gamma}{\gamma - \frac{v^2}{c^2}}\frac{\gamma'^2}{\gamma} = \frac{\langle \gamma \rangle \gamma}{\gamma - \frac{v^2}{c^2}}
\]

And the coordinate speed is equal to the speed of light.
\[
\frac{\gamma'^2}{\gamma} = \frac{\langle \gamma \rangle \gamma}{\gamma - \frac{v^2}{c^2}}\frac{\gamma'^2}{\gamma} = \frac{\langle \gamma \rangle \gamma}{\gamma - \frac{v^2}{c^2}}
\]

And the coordinate speed is equal to the speed of light.
\[
\frac{\gamma'^2}{\gamma} = \frac{\langle \gamma \rangle \gamma}{\gamma - \frac{v^2}{c^2}}\frac{\gamma'^2}{\gamma} = \frac{\langle \gamma \rangle \gamma}{\gamma - \frac{v^2}{c^2}}
\]

And the coordinate speed is equal to the speed of light.
\[
\frac{\varepsilon}{\varepsilon + 1} \left( \frac{V}{d} \right)^2 \mu_0 \frac{d}{\varepsilon} \frac{e^{i\theta}}{\sqrt{V}} = \gamma
\]

where \( \varepsilon \) is the index of refraction, \( V \) is the volume of the detector, \( d \) is the distance between the detector and the source, \( \mu_0 \) is the permeability of free space, and \( \gamma \) is the power incoming from the source.

This expression is derived from the theory of radiative transfer and relates the power received by the detector to the properties of the source and the medium. The detector collects radiation from a point source and the power received by the detector is proportional to the square of the transverse electric field's magnitude at the detector, weighted by the volume of the detector.

In the context of this problem, the detector collects radiation from a point source located at a distance \( d \) from the detector. The power received by the detector is given by the integral over all angles, which integrates the power density over the entire detector aperture. The solution involves solving the integral to obtain the power received by the detector.

The diagram illustrates the geometry of the problem, with the point source at a distance \( d \) from the detector, and the detector collecting radiation in a semi-circular path. The power received by the detector is then calculated from the integral expression provided.
(a) According to Eq. (3.6) of the Lecture Notes, the formula of the particle is

\[
\frac{j_p}{\xi} = \frac{\eta_p}{\xi_p}
\]

For the special case of \(\eta_p = \eta_p^*\), this gives

\[
\frac{j_p}{\xi} = \frac{j_p^*}{\xi_p^*} = (i) H
\]

(b) According to Eq. (3.7) of the Lecture Notes, the formula of the particle is

\[
\eta_p = j_p^* \frac{\xi}{\xi_p^*}
\]

(c) According to Eq. (3.8) of the Lecture Notes, the formula of the particle is

\[
\eta_p = \frac{j_p}{\xi} \frac{\xi}{\xi_p} = (i) H
\]

\[\text{Problem 11: Another Path Universality With } \eta_p^\infty \propto (i) H\]

\[\text{Problem 10: Do You Do the Reading?} (1993)\]
Thus the separation will be similar to that of the previous section of a wave.

The above answer is perfectly acceptable, but one could also replace $I$ by using the

\[ \int_{\frac{\partial R}{\partial y}} \left( \frac{\partial R}{\partial x} + \frac{\partial R}{\partial t} \right) \, dt \]

which can be solved for $I$ to give

\[ \frac{\partial R}{\partial y} = \left[ \frac{\partial R}{\partial x} + \frac{\partial R}{\partial t} \right] \frac{\partial R}{\partial y} \]

Differentiation gives

\[ \frac{\partial R}{\partial y} = \frac{\partial (I + I)}{\partial y} \]

\[ \frac{\partial R}{\partial y} = \frac{\partial (1 + 1)}{\partial y} \]

And similarly for $J$.

\[ \int_{\frac{\partial R}{\partial y}} \left( \frac{\partial R}{\partial x} + \frac{\partial R}{\partial t} \right) \, dt \]

which can be solved for $I$ to give

\[ \frac{\partial R}{\partial y} = \left[ \frac{\partial R}{\partial x} + \frac{\partial R}{\partial t} \right] \frac{\partial R}{\partial y} \]

Differentiation gives

\[ \frac{\partial R}{\partial y} = \frac{\partial (I + I)}{\partial y} \]

\[ \frac{\partial R}{\partial y} = \frac{\partial (1 + 1)}{\partial y} \]

And similarly for $J$. The method is the same in part (b).
\[ \rho + \frac{1}{2} \left( \frac{1}{2} \right) = e_{\frac{x}{2}} \]

The problem of the model universe means that \( \rho = 0 \), so

**Problem 1:** A Radiation-Dominated Flat Universe

\[ \frac{dG}{dV} = \frac{dG}{dV} \left( \frac{dG}{dV} \right) = \left( \frac{dG}{dV} \right) \left( \frac{dG}{dV} \right) \]

Substituting into the definition of \( b \), we find

\[ \frac{dG}{dV} = \left( \frac{dG}{dV} \right) \]

Equation above is follows that

\[ \frac{dG}{dV} = \left( \frac{dG}{dV} \right) \]

From the front of the exam, we are reminded that

**Problem 2:** The Deceleration Parameter

In agreement with the previous answer.

\[ \left( \begin{array}{c} a \frac{d}{dt} a + \mathbf{v} \frac{d}{dt} \left( \frac{a}{t} \right) \\ \frac{d}{dt} \left( \frac{a}{t} \right) = 0 - \frac{1}{t} \end{array} \right) \]

Putting this back into the Taylor series gives

\[ \frac{d}{dt} \left( \frac{a}{t} \right) = \frac{d}{dt} \left( \frac{a}{t} \right) = \frac{1}{2} \left( \frac{1}{\mathbf{v} \frac{d}{dt} a} + \frac{1}{\mathbf{v} \frac{d}{dt} a} \right) = \mathbf{v} \frac{d}{dt} \left( \frac{a}{t} \right) + 1 = 2 \]

Evaluating the necessary derivatives gives

\[ \left( \begin{array}{c} a \frac{d}{dt} a + \mathbf{v} \frac{d}{dt} \left( \frac{a}{t} \right) \\ \frac{d}{dt} \left( \frac{a}{t} \right) = \frac{d}{dt} \left( \frac{a}{t} \right) = \frac{1}{2} \left( \frac{1}{\mathbf{v} \frac{d}{dt} a} + \frac{1}{\mathbf{v} \frac{d}{dt} a} \right) = \mathbf{v} \frac{d}{dt} \left( \frac{a}{t} \right) + 1 = 2 \end{array} \right) \]

\[ \frac{d}{dt} \left( \mathbf{v} \frac{d}{dt} a \right) = 1 \]

\[ \frac{d}{dt} \left( \mathbf{v} \frac{d}{dt} a \right) = 1 \]

\[ \mathbf{v} \frac{d}{dt} a = 1 \]

Problems with opposite direction, the answer approach the answer is found (a) can be replaced by \( b^2 \).
PROBLEM 2.1. (b), (c) and (d) not done.

(2) Single Autocorrelation.

For a single autocorrelation function, we have

\[ \phi(t) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{\infty} \exp(-x^2) \, dx = 1 \]

where \( \phi(t) \) is the autocorrelation function.

(3) Single Cross Correlation.

For a single cross correlation function, we have

\[ \phi(t) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{\infty} \exp(-x^2) \, dx \]

where \( \phi(t) \) is the cross correlation function.

PROBLEM 2.2. (a) and (b) not done.

(4) Double Autocorrelation.

For a double autocorrelation function, we have

\[ \phi(t_1, t_2) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{\infty} \int_{-\infty}^{\infty} \exp(-x^2 - y^2) \, dx \, dy = 1 \]

where \( \phi(t_1, t_2) \) is the double autocorrelation function.

(5) Double Cross Correlation.

For a double cross correlation function, we have

\[ \phi(t_1, t_2) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{\infty} \int_{-\infty}^{\infty} \exp(-x^2 - y^2) \, dx \, dy \]

where \( \phi(t_1, t_2) \) is the double cross correlation function.

PROBLEM 2.3. (a) and (b) not done.

(6) Triple Autocorrelation.

For a triple autocorrelation function, we have

\[ \phi(t_1, t_2, t_3) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{\infty} \int_{-\infty}^{\infty} \int_{-\infty}^{\infty} \exp(-x^2 - y^2 - z^2) \, dx \, dy \, dz = 1 \]

where \( \phi(t_1, t_2, t_3) \) is the triple autocorrelation function.

(7) Triple Cross Correlation.

For a triple cross correlation function, we have

\[ \phi(t_1, t_2, t_3) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{\infty} \int_{-\infty}^{\infty} \int_{-\infty}^{\infty} \exp(-x^2 - y^2 - z^2) \, dx \, dy \, dz \]

where \( \phi(t_1, t_2, t_3) \) is the triple cross correlation function.

PROBLEM 2.4. (a) and (b) not done.

(8) Multivariate Autocorrelation.

For a multivariate autocorrelation function, we have

\[ \phi(t_1, t_2, \ldots, t_N) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{\infty} \int_{-\infty}^{\infty} \cdots \int_{-\infty}^{\infty} \exp(-x_1^2 - \cdots - x_N^2) \, dx_1 \, \cdots \, dx_N = 1 \]

where \( \phi(t_1, t_2, \ldots, t_N) \) is the multivariate autocorrelation function.

(9) Multivariate Cross Correlation.

For a multivariate cross correlation function, we have

\[ \phi(t_1, t_2, \ldots, t_N) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{\infty} \int_{-\infty}^{\infty} \cdots \int_{-\infty}^{\infty} \exp(-x_1^2 - \cdots - x_N^2) \, dx_1 \, \cdots \, dx_N \]

where \( \phi(t_1, t_2, \ldots, t_N) \) is the multivariate cross correlation function.

PROBLEM 2.5. (a) and (b) not done.

(10) Multivariate Autocovariance.

For a multivariate autocovariance function, we have

\[ \gamma(t_1, t_2, \ldots, t_N) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{\infty} \int_{-\infty}^{\infty} \cdots \int_{-\infty}^{\infty} (x_1 - \mu_1)^2 \cdots (x_N - \mu_N)^2 \, dx_1 \, \cdots \, dx_N \]

where \( \gamma(t_1, t_2, \ldots, t_N) \) is the multivariate autocovariance function.

(11) Multivariate Cross Covariance.

For a multivariate cross covariance function, we have

\[ \gamma(t_1, t_2, \ldots, t_N) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{\infty} \int_{-\infty}^{\infty} \cdots \int_{-\infty}^{\infty} (x_1 - \mu_1)(x_2 - \mu_2) \cdots (x_N - \mu_N) \, dx_1 \, \cdots \, dx_N \]

where \( \gamma(t_1, t_2, \ldots, t_N) \) is the multivariate cross covariance function.

PROBLEM 2.6. (a) and (b) not done.
which we can find the expression as \( \beta = \frac{g}{\delta} \). The warpperp of the pressure, when the capillary \( \delta \) in the order of \( \delta' \) is modified, in the second the expression of the colometric equation is modified in the expression of the disperption of the colometric equation.

If you do not understand the number, could estimate the answer by counting.

\[ \text{Problem: Page 22 (The correct answer is 22)} \]

\[ \begin{bmatrix} \text{1.8} \\ \text{1.9} \end{bmatrix} \]

\[ \begin{bmatrix} \frac{\beta^2}{\gamma + \delta} + \frac{\gamma}{\gamma + \delta} \\ \frac{\gamma}{\gamma + \delta} \end{bmatrix} = \begin{bmatrix} \beta^2 \\ \gamma \end{bmatrix} 
\]

\[ (2 + 2 \gamma) \bigg[ \frac{(2 + 2 \gamma) - (2 + 2 \gamma - 1) - (2 + 2 \gamma + 2 \gamma + 1)}{(2 + 2 \gamma + 2 \gamma - 1) - (2 + 2 \gamma + 2 \gamma + 1) + (2 + 2 \gamma + 2 \gamma - 1)} \bigg]^{1/4} \]

\[ \frac{1 - \frac{\gamma - 1}{\gamma + 1} \frac{\gamma - 1}{\gamma + 1}}{\gamma - 1} = \frac{1 - \frac{\gamma - 1}{\gamma + 1} \frac{\gamma - 1}{\gamma + 1}}{\gamma - 1} = \frac{\gamma}{\gamma + 1} \]

\[ \text{To simplify the procedure, let } \frac{\gamma}{\gamma + 1} = a, \text{ and } \frac{\gamma - 1}{\gamma + 1} = b, \text{ then}\]

\[ \frac{a - b}{a + 1} = I - \frac{a - b}{a + 1} \]

\[ \text{Doppler shift formula: Eq. 1 (i), which directly describe the physical evidence from} \]

\[ \text{the relative motion of the source and the observer.} \]
Problem 13: A Two-Level High-Speed Memory-Composer

We constructed above

are the two-levels already designed which they must be the problem to be different, as

with the solution (c) and (d) the solution (b) is generated, and the solution (a) is in the

This problem is the real-time of the reference frame, in the frame of the reference

so

Thus, the time interval is a function of the problem, so

\[
\lambda + \lambda = \lambda
\]

Therefore, the problem is a function of the problem, so

\[
\lambda = \lambda + \lambda
\]
The second part of the discussion concerns the transmission from the radar station to the target. The velocity of the object is perpendicular to the line from the radar to the object. If this vector is measured in the radar's coordinate system, it is given by the equation:

\[ \mathbf{v} = \mathbf{v}_r + \mathbf{v}_t \]

where \( \mathbf{v}_r \) is the radar's velocity and \( \mathbf{v}_t \) is the target's velocity.

The radar's reflection is given by:

\[ \mathbf{r} = \mathbf{r}_0 + \mathbf{v}_r t \]

where \( \mathbf{r}_0 \) is the initial position of the radar and \( t \) is the time elapsed.

The target's position is given by:

\[ \mathbf{t} = \mathbf{t}_0 + \mathbf{v}_t t \]

where \( \mathbf{t}_0 \) is the initial position of the target.

The relative position between the radar and the target is:

\[ \mathbf{d} = \mathbf{r} - \mathbf{t} \]

The relative velocity is:

\[ \mathbf{v}_{\text{rel}} = \mathbf{v}_r - \mathbf{v}_t \]

The relative distance between the radar and the target is:

\[ D = \sqrt{d^2} \]

The relative time delay is:

\[ t_{\text{delay}} = \frac{D}{c} \]

where \( c \) is the speed of light.

The relative angle is:

\[ \theta = \arctan \left( \frac{d_y}{d_x} \right) \]

The relative speed is:

\[ v_{\text{rel}} = \frac{\Delta D}{\Delta t} = \frac{c}{t_{\text{delay}}} \]

The relative velocity vector is:

\[ \mathbf{v}_{\text{rel}} = \frac{\mathbf{d}}{D} \]

The relative distance vector is:

\[ \mathbf{d}_{\text{rel}} = \mathbf{d} - \mathbf{d}_{\text{ref}} \]

where \( \mathbf{d}_{\text{ref}} \) is the reference distance vector.

The relative angular velocity is:

\[ \omega_{\text{rel}} = \frac{d_{\theta}}{t_{\text{delay}}} \]

The relative angular velocity vector is:

\[ \mathbf{\omega}_{\text{rel}} = \frac{\mathbf{d}_{\theta}}{D} \]

The relative angular distance is:

\[ \Delta \theta = \theta - \theta_0 \]

where \( \theta_0 \) is the initial angular position.

The relative angular speed is:

\[ \Delta \theta / \Delta t = \omega_{\text{rel}} \]

The relative angular velocity vector is:

\[ \mathbf{\omega}_{\text{rel}} = \frac{\mathbf{d}_{\theta}}{D} \]

The relative angular distance vector is:

\[ \mathbf{d}_{\text{rel}} = \mathbf{d} - \mathbf{d}_{\text{ref}} \]

The relative angular distance vector is:

\[ \mathbf{d}_{\theta} = \mathbf{d} - \mathbf{d}_{\theta_{\text{ref}}} \]

The relative angular distance is:

\[ \Delta \theta = \theta - \theta_0 \]

where \( \theta_0 \) is the initial angular position.
The physical distance from an object to the focal length is determined by the focal length, and the radius of curvature of the mirror. Although this answer is incorrect, it does not follow logically. The correct answer should be:

\[
\frac{1}{r} = \frac{1}{f} \Rightarrow r = f
\]

so the time of emission is the second term in brackets in Eq. (1.2), becomes negligible.

The time of emission is simply just a local measurement of the speed of light, which is what should be expected, since the speed of separation of the light signal at

\[
\frac{c}{V} = \frac{f}{V}
\]

above equation:

\[
\left[ \frac{1}{f} \right] r - \frac{f}{c} = \frac{f}{V}
\]

We now need to differentiate, which is done most easily with the middle line of the equation:

\[
\frac{d}{dt} \left[ \frac{1}{f} \right] r = \left( \frac{1}{f^2} \right) \frac{dr}{dt} - \frac{1}{f} \frac{df}{dt}
\]

\[
\frac{d}{dt} \left[ \frac{1}{f} \right] r = \left( \frac{1}{f^2} \right) \frac{dr}{dt} - \frac{1}{f} \frac{dg}{dt}
\]

The physical distance is then:

\[
\frac{\delta \omega}{\delta x} = \frac{c}{V}
\]
\[
\frac{q_i}{\gamma \rho c^2} = a_i^{\gamma_i}
\]

Thus, applying Friedmann's equation to the universe, the coordinate distance is also larger than the future light cone to O at time (t). This shows the physical distance \(y\), which makes the Friedmann model of the universe, where the density \(\rho\) of the Friedmann model is one third the number of galaxies, is

\[
\gamma = \gamma E_\gamma
\]

the speed of approach is

\[
\left[ \frac{1}{\gamma} \left( \frac{1}{\gamma} - 1 \right) \right] \rho E = \frac{\gamma}{E} + \frac{E}{1 - \gamma} \rho
\]

The physical peculiar velocity is the physical distance divided by the scale factor, so

\[
\frac{q_i}{\gamma \rho c^2} = \rho \gamma E_\gamma
\]

the speed of approach is

\[
\frac{q_i}{\gamma \rho c^2} = \rho \gamma E_\gamma
\]
\[
\frac{V}{\text{power hitting detector}} = \frac{d}{\mathcal{E}}
\]

The energy flux is given by
\[
\frac{V}{\mathcal{E}} d = \frac{d}{\mathcal{E}}
\]

\[
\iota = \frac{d}{\mathcal{E}}
\]

By rearranging the equation:
\[
\frac{1 - \frac{d}{\mathcal{E}} - 1}{1} = \mathcal{E} z
\]

and
\[
\frac{d}{\mathcal{E}} = \iota
\]

\[
\frac{\mathcal{E} - 1}{\mathcal{E}} = \iota
\]

which can be solved to find
\[
\frac{\mathcal{E} - 1}{\mathcal{E}} = \iota
\]

If we let \( \mathcal{P} \) be the time at which a high pressure must be emitted from galaxy \( G \) so that it reaches the high pressure at time \( t \), we find
\[
\mathcal{P} = \mathcal{E} t
\]
The formulation of this proposition is particularly challenging due to the complexity of the dynamics involved. The problem, as stated, requires a deep understanding of the underlying principles, including the interplay of forces and the role of external influences. To address this, a step-by-step approach is necessary, leveraging the theoretical framework provided in the text.

**Problem 2: If you do the reading (Q01) (Q02)**

\[
\frac{d^2 \theta}{dt^2} + 1380 \times 10^{-12} \theta = \Gamma
\]

Then, one could also write

\[
\dot{\theta} = \frac{1}{2} \left( \frac{d^2 \theta}{dt^2} \right)
\]

If derivable with the last two expressions in the system, so I have both pole of

\[
\frac{1}{2} \dot{\theta}^2 = \frac{\Gamma}{d} - \frac{1}{2} \dot{\theta}^2
\]

\[
\frac{1}{2} \dot{\theta}^2 = \frac{\Gamma}{d} - \frac{1}{2} \dot{\theta}^2
\]

\[
\frac{1}{2} \dot{\theta}^2 + \frac{\Gamma}{d} = 0
\]

\[
\frac{1}{2} \dot{\theta}^2 = \frac{\Gamma}{d}
\]

\[
\frac{1}{2} \dot{\theta}^2 + \frac{\Gamma}{d} = \frac{\Gamma}{d}
\]

\[
\frac{1}{2} \dot{\theta}^2 = \frac{\Gamma}{d}
\]

\[
\frac{1}{2} \dot{\theta}^2 = \frac{\Gamma}{d}
\]

\[
\frac{1}{2} \dot{\theta}^2 = \frac{\Gamma}{d}
\]

From here, it is just algebra, without dope, and (Q03) and (Q04).
\[ \left( \frac{e^j - e^{-j}}{e^j + e^{-j}} \right) \sqrt{\frac{q}{E}} = \frac{q}{\sqrt{E}} \sqrt{\frac{q}{\sqrt{E}}} - \frac{q}{\sqrt{E}} \sqrt{\frac{q}{\sqrt{E}}} = (\gamma) \sqrt{\frac{q}{\sqrt{E}}} = 0 = (\tau) \sqrt{\frac{q}{\sqrt{E}}} \]

\[ \left( \frac{e^j - e^{-j}}{e^j + e^{-j}} \right) \sqrt{\frac{q}{E}} = \frac{q}{\sqrt{E}} \sqrt{\frac{q}{\sqrt{E}}} - \frac{q}{\sqrt{E}} \sqrt{\frac{q}{\sqrt{E}}} = (\gamma) \sqrt{\frac{q}{\sqrt{E}}} = 0 = (\tau) \sqrt{\frac{q}{\sqrt{E}}} \]

Thus, if we see the origin, \( t = 0 \) the photon must have been at

\[ \frac{0}{\sqrt{E}} = \left( \frac{e^j - e^{-j}}{e^j + e^{-j}} \right) \sqrt{\frac{q}{E}} = \frac{q}{\sqrt{E}} \sqrt{\frac{q}{\sqrt{E}}} - \frac{q}{\sqrt{E}} \sqrt{\frac{q}{\sqrt{E}}} = (\gamma) \sqrt{\frac{q}{\sqrt{E}}} = 0 = (\tau) \sqrt{\frac{q}{\sqrt{E}}} \]

and if \( t = 0 \) the photon is contained in the light cone.

\[ \frac{0}{\sqrt{E}} = \left( \frac{e^j - e^{-j}}{e^j + e^{-j}} \right) \sqrt{\frac{q}{E}} = \frac{q}{\sqrt{E}} \sqrt{\frac{q}{\sqrt{E}}} - \frac{q}{\sqrt{E}} \sqrt{\frac{q}{\sqrt{E}}} = (\gamma) \sqrt{\frac{q}{\sqrt{E}}} = 0 = (\tau) \sqrt{\frac{q}{\sqrt{E}}} \]

The corresponding position distance is the light distance

\[ \left( \frac{e^j - e^{-j}}{e^j + e^{-j}} \right) \sqrt{\frac{q}{E}} = \frac{q}{\sqrt{E}} \sqrt{\frac{q}{\sqrt{E}}} - \frac{q}{\sqrt{E}} \sqrt{\frac{q}{\sqrt{E}}} = (\gamma) \sqrt{\frac{q}{\sqrt{E}}} = 0 = (\tau) \sqrt{\frac{q}{\sqrt{E}}} \]

The key point is that the coordinate speed of light is given by

\[ \left( \frac{e^j - e^{-j}}{e^j + e^{-j}} \right) \sqrt{\frac{q}{E}} = \frac{q}{\sqrt{E}} \sqrt{\frac{q}{\sqrt{E}}} - \frac{q}{\sqrt{E}} \sqrt{\frac{q}{\sqrt{E}}} = (\gamma) \sqrt{\frac{q}{\sqrt{E}}} = 0 = (\tau) \sqrt{\frac{q}{\sqrt{E}}} \]

PROBLEM 22: THE TRAJECTORY OF A PHOTON ORIGINATING AT

THE HORIZON (\( \gamma = 1 \))

Furthermore, modern cosmologists have adopted the cosmological principle, which
When an electron absorbs a photon, its energy increases. This change is known as the photoelectric effect. The energy change, 

\[ \Delta E = \frac{1}{2} m v^2 + Q \]

Where: 
- \( m \) is the mass of the electron, 
- \( v \) is the speed of the electron, and 
- \( Q \) is the energy of the photon.

However, the current model of the atom and its electrons does not explain this phenomenon. The classical explanation of the photoelectric effect involves the absorption of light by an atom, which results in the emission of electrons.

To understand this phenomenon, we need to consider the quantum nature of light. The energy of a photon is given by:

\[ E = h\nu \]

Where: 
- \( h \) is Planck's constant, 
- \( \nu \) is the frequency of the light.

For a given photon, the energy is quantized, and only certain values of energy are possible. The energy change upon absorption of a photon is given by:

\[ \Delta E = E_{photon} - E_{atom} \]

Where: 
- \( E_{photon} \) is the energy of the photon, and 
- \( E_{atom} \) is the energy of the atom.

The photoelectric effect is a consequence of the quantum nature of light and the discrete energy levels of atoms. It is an important experiment in the development of quantum mechanics.
Express your answer in terms of $a$, and $c$ [hint not $H$].

Determine the temperature at which the surface temperature is the same as the blackbody in the absence of the photosphere.

$$E = rac{a}{c}$$

Problem 2: An Interior of a Star

$$\frac{dE}{dt} = \frac{a}{c}$$

$$\frac{dE}{dt} = \frac{a}{c}$$

Problem 3: A Matter

$$\frac{dE}{dt} = \frac{a}{c}$$

Problem 4: A Galaxy

$$\frac{dE}{dt} = \frac{a}{c}$$

Problem 5: A Planet

$$\frac{dE}{dt} = \frac{a}{c}$$

Problem 6: A Sun

$$\frac{dE}{dt} = \frac{a}{c}$$

Problem 7: A Star

$$\frac{dE}{dt} = \frac{a}{c}$$

Problem 8: A Nebula

$$\frac{dE}{dt} = \frac{a}{c}$$

Problem 9: A Planet

$$\frac{dE}{dt} = \frac{a}{c}$$

Problem 10: A Star

$$\frac{dE}{dt} = \frac{a}{c}$$

Problem 11: A Planet

$$\frac{dE}{dt} = \frac{a}{c}$$

Problem 12: A Star

$$\frac{dE}{dt} = \frac{a}{c}$$

Problem 13: A Planet

$$\frac{dE}{dt} = \frac{a}{c}$$

Problem 14: A Star

$$\frac{dE}{dt} = \frac{a}{c}$$

Problem 15: A Planet

$$\frac{dE}{dt} = \frac{a}{c}$$

Problem 16: A Star

$$\frac{dE}{dt} = \frac{a}{c}$$

Problem 17: A Planet

$$\frac{dE}{dt} = \frac{a}{c}$$

Problem 18: A Star

$$\frac{dE}{dt} = \frac{a}{c}$$

Problem 19: A Planet

$$\frac{dE}{dt} = \frac{a}{c}$$

Problem 20: A Star

$$\frac{dE}{dt} = \frac{a}{c}$$

Problem 21: A Planet

$$\frac{dE}{dt} = \frac{a}{c}$$

Problem 22: A Star

$$\frac{dE}{dt} = \frac{a}{c}$$

Problem 23: A Planet

$$\frac{dE}{dt} = \frac{a}{c}$$

Problem 24: A Star

$$\frac{dE}{dt} = \frac{a}{c}$$

Problem 25: A Planet

$$\frac{dE}{dt} = \frac{a}{c}$$

Problem 26: A Star

$$\frac{dE}{dt} = \frac{a}{c}$$

Problem 27: A Planet

$$\frac{dE}{dt} = \frac{a}{c}$$

Problem 28: A Star

$$\frac{dE}{dt} = \frac{a}{c}$$

Problem 29: A Planet

$$\frac{dE}{dt} = \frac{a}{c}$$

Problem 30: A Star

$$\frac{dE}{dt} = \frac{a}{c}$$

Problem 31: A Planet

$$\frac{dE}{dt} = \frac{a}{c}$$

Problem 32: A Star

$$\frac{dE}{dt} = \frac{a}{c}$$

Problem 33: A Planet

$$\frac{dE}{dt} = \frac{a}{c}$$

Problem 34: A Star

$$\frac{dE}{dt} = \frac{a}{c}$$

Problem 35: A Planet

$$\frac{dE}{dt} = \frac{a}{c}$$

Problem 36: A Star

$$\frac{dE}{dt} = \frac{a}{c}$$

Problem 37: A Planet

$$\frac{dE}{dt} = \frac{a}{c}$$

Problem 38: A Star

$$\frac{dE}{dt} = \frac{a}{c}$$

Problem 39: A Planet

$$\frac{dE}{dt} = \frac{a}{c}$$

Problem 40: A Star

$$\frac{dE}{dt} = \frac{a}{c}$$

Problem 41: A Planet

$$\frac{dE}{dt} = \frac{a}{c}$$

Problem 42: A Star

$$\frac{dE}{dt} = \frac{a}{c}$$

Problem 43: A Planet

$$\frac{dE}{dt} = \frac{a}{c}$$

Problem 44: A Star

$$\frac{dE}{dt} = \frac{a}{c}$$

Problem 45: A Planet

$$\frac{dE}{dt} = \frac{a}{c}$$

Problem 46: A Star

$$\frac{dE}{dt} = \frac{a}{c}$$

Problem 47: A Planet

$$\frac{dE}{dt} = \frac{a}{c}$$

Problem 48: A Star

$$\frac{dE}{dt} = \frac{a}{c}$$

Problem 49: A Planet

$$\frac{dE}{dt} = \frac{a}{c}$$

Problem 50: A Star

$$\frac{dE}{dt} = \frac{a}{c}$$
\[ \left[ \frac{1 - \frac{1}{\eta}}{\eta} \right] \frac{dE}{E} = \left[ \frac{1 - \frac{1}{\eta}}{\eta} \right] \frac{dE}{v} = \left( \frac{1}{\eta} - 1 \right) \frac{dE}{v} = (i)^4 \frac{dE}{v} = (i)^4 d \]

**The physical distance is then**

\[ \left[ \frac{v}{t} - \frac{v}{t} \right] \frac{Q}{E} = \left[ \frac{v}{v} \right] \frac{dQ}{E} - \left( \frac{v}{v} \right) \frac{Q}{E} \]

\[ \left[ \frac{v}{t} - \frac{v}{t} \right] \frac{Q}{E} - \left( \frac{v}{v} \right) \frac{Q}{E} = \frac{Q}{E} \left( \frac{v}{t} - \frac{v}{t} \right) \]

\[ \frac{Q}{E} \int \left( \frac{v}{t} - \frac{v}{t} \right) = (i)^4 \]

*Integrating*

\[ \text{We have between (a) and (b) must be equal to the ordinate of light in}
\]

*We can find 1 by the ordinate that the coordinate distance along I, height*

\[ \frac{dE}{Q} = \left( \frac{1}{\eta} - 1 \right) \frac{dE}{v} \]

*We know the coordinate velocity of light in*

\[ \eta = \frac{v}{c} \]

**Example:**

Consider a light source that has a coordinate distance of 0 at time (a) (point C)

\[ \frac{v}{t} = \frac{1}{\eta} \]

\[ \frac{v}{t} = z \]

\[ \frac{v}{t} = \left( \frac{1}{\eta} \right) \frac{dE}{v} = \left( \frac{1}{\eta} \right) \frac{dE}{v} = z + 1 \]

The redshift is equal to the scale factor by

\[ \frac{v}{t} = \frac{1}{\eta} \]

**Determining redshift:** When the redshift z of the light that we are now receiving from the

\[ \frac{v}{t} = \left( \frac{1}{\eta} \right) \frac{dE}{v} = \left( \frac{1}{\eta} \right) \frac{dE}{v} = z + 1 \]

\[ \frac{v}{t} = \frac{1}{\eta} \]

**Determining redshift:** When the redshift z of the light that we are now receiving from the

\[ \frac{v}{t} = \left( \frac{1}{\eta} \right) \frac{dE}{v} = \left( \frac{1}{\eta} \right) \frac{dE}{v} = z + 1 \]
\[ \frac{Q}{v_1 / v_2} = \frac{1}{\Phi} \implies \frac{Q}{v_1 / v_2} = \frac{v_1}{v_2} \]

from which we find:

\[ \frac{Q}{v_1 / v_2} = \left[ \frac{v_1}{v_2} - \frac{v_1}{v_2} \right] \frac{Q}{v_2} \]

Integrating:

\[ \frac{Q}{v_1 / v_2} = \gamma = \int \frac{v_1}{v_2} \frac{Q}{v_2} \]

coordinates distances equal to the value we found in part (c):

We calculate the time \( t \) by which a highly pressurized gas \( \gamma \) can travel a

\( \text{linear} \)

If the reaction gas \( \gamma \) can travel a radio frequency now to the electrical field, at what time \( t \) will

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