\[ \left( 1 + \frac{\Delta t}{\mathcal{H}_0} \right)^{\frac{1}{2}} \approx \left( 1 + \frac{\Delta t}{\mathcal{H}_0} \right)^{\frac{1}{2}} \approx \left( 1 - \frac{\Delta t}{\mathcal{H}_0} \right)^{\frac{1}{2}} \]

where we have used the definition of the Hamiltonian at the time of recombination.

We found in Lecture Notes 8 that

\[ \mathcal{H}_0 \approx 1 - \frac{H \mathcal{P}^3}{v^3} \]

so

\[ \left( 1 - \frac{\Delta t}{\mathcal{H}_0} \right) \approx \left( 1 - \frac{\Delta t}{\mathcal{H}_0} \right)^{\frac{1}{2}} \approx \left( 1 + \frac{\Delta t}{\mathcal{H}_0} \right)^{\frac{1}{2}} \]

and

\[ \mathcal{H}_0 \approx 1 - \frac{H \mathcal{P}^3}{v^3} \]

Problem 1: The Horizon Problem

Problem 2: The Flatness Problem

Problem Set 9 Solutions Fall 2018

December 17, 2018

Physics 8.38: Early Universe

Massachusetts Institute of Technology
\[ e^{-2\cdot10^{-9} \times 2.92} = \]

\[
\begin{align*}
\text{Problem 3: The Magnetic Monopole Problem (10 points)}
\end{align*}
\]
The integral can be put in the form

\[ \int x^\nu \cdot e^{-x} \, dx = \frac{e^{-x} 
abla^\nu}{\nu!} \int x^{\nu} = 1 \]

Then the numerator of the polynomial becomes

\[ n(x) = \frac{e^{-x} \nabla^\nu}{\nu!} \]

Thus the numerator of the polynomial becomes

\[ n(x) = \frac{e^{-x} \nabla^\nu}{\nu!} \]

Numerically, we can simply insert numbers into the above formula but it more

\[ \int e^{-x} \nabla^\nu \, dx = \frac{e^{-x} \nabla^\nu}{\nu!} \]

Finally, we have

\[ \int e^{-x} \nabla^\nu \, dx = \frac{e^{-x} \nabla^\nu}{\nu!} \]

Hence

\[ \int e^{-x} \nabla^\nu \, dx = \frac{e^{-x} \nabla^\nu}{\nu!} \]

(14) \[ 1 \times 10^{-1} \times 60 \times 72 = \frac{e^{-x} \nabla^\nu}{\nu!} \]

(13) \[ \left( \frac{1 \times 10^{-1} \times 60 \times 72}{\nu!} \right) = \frac{e^{-x} \nabla^\nu}{\nu!} \]

(12) \[ \left( \frac{1 \times 10^{-1} \times 60 \times 72}{\nu!} \right) = \frac{e^{-x} \nabla^\nu}{\nu!} \]

(11) \[ \left( \frac{1 \times 10^{-1} \times 60 \times 72}{\nu!} \right) = \frac{e^{-x} \nabla^\nu}{\nu!} \]

(10) \[ \left( \frac{1 \times 10^{-1} \times 60 \times 72}{\nu!} \right) = \frac{e^{-x} \nabla^\nu}{\nu!} \]

(9) \[ \left( \frac{1 \times 10^{-1} \times 60 \times 72}{\nu!} \right) = \frac{e^{-x} \nabla^\nu}{\nu!} \]

(8) \[ \left( \frac{1 \times 10^{-1} \times 60 \times 72}{\nu!} \right) = \frac{e^{-x} \nabla^\nu}{\nu!} \]

(7) \[ \left( \frac{1 \times 10^{-1} \times 60 \times 72}{\nu!} \right) = \frac{e^{-x} \nabla^\nu}{\nu!} \]

(6) \[ \left( \frac{1 \times 10^{-1} \times 60 \times 72}{\nu!} \right) = \frac{e^{-x} \nabla^\nu}{\nu!} \]

(5) \[ \left( \frac{1 \times 10^{-1} \times 60 \times 72}{\nu!} \right) = \frac{e^{-x} \nabla^\nu}{\nu!} \]

(4) \[ \left( \frac{1 \times 10^{-1} \times 60 \times 72}{\nu!} \right) = \frac{e^{-x} \nabla^\nu}{\nu!} \]

(3) \[ \left( \frac{1 \times 10^{-1} \times 60 \times 72}{\nu!} \right) = \frac{e^{-x} \nabla^\nu}{\nu!} \]

(2) \[ \left( \frac{1 \times 10^{-1} \times 60 \times 72}{\nu!} \right) = \frac{e^{-x} \nabla^\nu}{\nu!} \]

(1) \[ \left( \frac{1 \times 10^{-1} \times 60 \times 72}{\nu!} \right) = \frac{e^{-x} \nabla^\nu}{\nu!} \]

(0) \[ \left( \frac{1 \times 10^{-1} \times 60 \times 72}{\nu!} \right) = \frac{e^{-x} \nabla^\nu}{\nu!} \]
When Claire, a solution by Barton, developed from 2009, with numerical calculations updated by ...

\[ \frac{\text{def} \, V_0 + \text{def} \, V_p + \text{def} \, V_0 + \text{def} \, V_0^2}{a_p} = \frac{i \phi}{i \rho(\nu)} \]

Since \( \phi \) the equation can be restored as

\[ \frac{\text{def} \, V_0 + \text{def} \, V_p + \text{def} \, V_0 + \text{def} \, V_0^2}{a_p} \]

Thus the form is that we have already found.

\[ \frac{(j) \phi}{i \rho(\nu)} \int_{0}^{a_p} (j) \phi = (j) \frac{\phi}{i \rho} = (j)^{\text{def} \, \phi} \]

To find the horizon distance now we must evaluate \( \int_{0}^{a_p} \frac{(j) \phi}{i \rho} \).

The form of the formula we were used to find,

\[ \frac{(j) \phi}{i \rho(\nu)} \int_{0}^{a_p} \frac{(j) \phi}{i \rho} = \frac{(j) \phi}{i \rho} \]

The form of the distance between the horizon and the point, the point of reference at which it is a distance, is a point at which the horizon is.

In this we have assumed as the height over which the calculation is done, \( \phi = 0 \), and the physical value of \( \phi \).

\[ \int_{0}^{a_p} \frac{(j) \phi}{i \rho} = \frac{(j) \phi}{i \rho} \]

We deduce that for a height, formally, formally, the result is,

\[ \left\{ \frac{(j) \phi \text{def} \, V_0 + \phi \text{def} \, V_p + \phi \text{def} \, V_0}{(j) \phi \text{def} \, V_0 + \phi \text{def} \, V_p + \phi \text{def} \, V_0} \right\} = \frac{(j) \phi}{i \rho} \]

\[ \frac{(j) \phi}{i \rho} \]

\[ \text{From the metric,} \]

\[ \text{UNIVERSE : THE DISTANCE FOR THE PRESENT} \]
This can also be checked with the relation \( H = 3.0 \times 10^7 \text{ m/s}^2 \).

As a result,

\[
\frac{\text{m/sec}^2}{\text{m/sec}^2} = \frac{6.2 \times 10^7 \text{ m/sec}^2}{9.88 \times 10^7 \text{ m/sec}^2} = \frac{6.2}{9.88} = \frac{0.63}{1.0}
\]

We thus find

\[
\frac{\text{m/sec}^2}{\text{m/sec}^2} = \frac{6.2}{9.88} = \frac{0.63}{1.0}
\]

Thereby a portion distance of 50 billion high-years for the computation in which we

\[\text{Thus we get:} \quad \frac{\text{m/sec}^2}{\text{m/sec}^2} = \frac{6.2}{9.88} = \frac{0.63}{1.0}
\]

we recall that

We are asked to give the portion distance both in high-years and m/sec. For this

we would found bound \( 3 \times 10^7 \text{ m/sec}^2 \) which differs significantly by about 2%.

\[\text{We would have found bound} \quad \frac{0.63}{1.0} = \frac{0.63}{1.0}
\]

we recall that

\[\text{We would have found bound} \quad \frac{0.63}{1.0} = \frac{0.63}{1.0}
\]

\[\text{we would have found bound} \quad \frac{0.63}{1.0} = \frac{0.63}{1.0}
\]

\[\text{we would have found bound} \quad \frac{0.63}{1.0} = \frac{0.63}{1.0}
\]

Thus we have found bound with different significantly by about 2%.

\[\text{Thus we have found bound} \quad \frac{0.63}{1.0} = \frac{0.63}{1.0}
\]

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\]

\[\text{Thus we have found bound} \quad \frac{0.63}{1.0} = \frac{0.63}{1.0}
\]
This text concerns the mathematics of probability and quantum mechanics. It discusses the concept of density operators and their relation to the density matrix. The text includes a derivation involving the expression for the density matrix of a quantum system. The derivation includes steps involving integrals and algebraic manipulation to arrive at a final expression. The context is related to quantum mechanics and the density matrix formalism.
Given by:

\[ \frac{\sqrt[2]{a} - 1}{\sqrt[2]{a} + 1} = z + 1 \]

so all that remains is to calculate the modulus. The modulus in special relativity is:

\[ \frac{\sqrt[2]{a} + 1^2}{\sqrt[2]{a} - 1^2} = \frac{2}{a} \quad \text{and} \quad \frac{\sqrt[2]{a} - 1^2}{\sqrt[2]{a} + 1^2} = \frac{a}{2} \]

We have shown in the previous part that

\[ \frac{\sqrt[2]{a} + 1^2}{\sqrt[2]{a} - 1^2} = \frac{2}{a} \quad \text{and} \quad \frac{\sqrt[2]{a} - 1^2}{\sqrt[2]{a} + 1^2} = \frac{a}{2} \]

We know from part (a) of the previous problem that \( r = \sqrt{a \rho^{2}} \), and since we are

\[ \rho P \cdot \rho = \rho P \rho \]

used to denote it, so the two expressions for \( d \) must be equal:

The proper length of the path is independent of the coordinate system

\[ \rho \rho P \cdot \rho = \rho \rho P = \rho P \rho \]

where the general relativistic metric (Lorentz-Minkowski, unprimed coordinates) be

\[ \rho \rho P \cdot \rho = \rho P \rho \]

provided coordinates (reduction to 10).

Let the special relativistic metric be defined by:

\[ \rho \rho P \cdot \rho = \rho P \rho = \rho P \rho \]

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Let the special relativistic metric be defined by:

\[ \rho \rho P \cdot \rho = \rho P \rho = \rho P \rho \]

where the general relativistic metric (Lorentz-Minkowski, unprimed coordinates) be

\[ \rho \rho P \cdot \rho = \rho P \rho \]
\[
\begin{align*}
\mathcal{V} + 1/\lambda^2 &= \beta \\

\text{Substituting the result into the expression for }\mathcal{V}\text{ above yields an equation that can be solved for }\beta.
\end{align*}
\]

\[
\lambda = \frac{\sqrt{\mathcal{V}^2 - 2\mathcal{V}}}{-\mathcal{V}} = \mu
\]

The transformation equation multipled by \(\mu\) gives:
\[
\begin{align*}
\mathcal{V}^2 - \mathcal{V}^2\lambda^2 &= \mu \\
\mathcal{V}^2 - \mathcal{V}^2\lambda^2 &= \mu
\end{align*}
\]

We have the following transformation equations:
\[
\begin{align*}
\mathcal{V}^2 - \mathcal{V}^2\lambda^2 &= \mu \\
\lambda^2 - \lambda^2\mu^2 &= \lambda
\end{align*}
\]

As expected, this agrees with the result found in part (d) of the previous problem.

\[
\begin{align*}
\mathcal{V}^2 + 1/\lambda^2 - \lambda^2 &= \mu \\
\mathcal{V}^2 + 1/\lambda^2 - \lambda^2 &= \mu
\end{align*}
\]

Finishing we substitute these expressions into the special relativistic expression for the invariant interval \(\Delta \xi = \sqrt{\mathcal{V}^2 - 2\mathcal{V}}\).