Module I : Units, Dimensions and Vectors

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Question: Consider three physical quantities A, B and C such that $\dim(A) = ML^2T^{-1}, \dim(B) = LT^{-1}$ and $\dim(C) = M^{-1}L^3T^{-2}$. Using these physical quantities construct a quantity D with dimensions of length and a quantity E with dimensions of time.

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$$\begin{aligned}\dim(D) &= \dim(A^x) \times \dim(B^y) \times \dim(C^z) \\ &= (ML^2T^{-1})^x \times (LT^{-1})^y \times (M^{-1}L^3T^{-2})^z \\ &= M^{x-z}L^{2x+y+3z}T^{-x-y-2z} = M^0L^1T^0\end{aligned}$$

$A = \hbar, B = c, C = G \implies$ Planck length $l_p = \sqrt{\frac{\hbar G}{c^3}} \approx 10^{-35}$m

Similarly we can also construct Planck time $t_p = \sqrt{\frac{\hbar G}{c^5}}$