

HOMEWORK 7

Due: Tuesday, April 4

Problems: Theory of Relativity

(Griffiths, Section 12.1)

12.10, 12.14, and 12.15

Problem 7

Show that the scalar product of two 4D-vectors $A^i = (A^0, A_x, A_y, A_z)$ and $B^i = (B^0, B_x, B_y, B_z)$ is an invariant of the Lorentz transformations, i.e. $A^i B_i = A'^i B'_i$. The vectors A'^i and B'^i are the vectors A^i and B^i expressed via coordinates of the moving frame K' . The velocity of K' -frame is $\mathbf{V} = V e_x$, where e_x is the unit vector of the x- axis.