

$$\left\{ \begin{array}{l} \text{① } v_d = 0 \text{ at } \text{exit} \\ \text{② } v_d + w_d = 0 \Rightarrow a = -\frac{v_d}{c} \end{array} \right\} \Rightarrow \gamma = \frac{1}{a + \frac{v_d}{c}} = \frac{-\frac{c}{v_d}}{-\frac{v_d}{c} + \frac{v_d}{c}} = -1 \quad \text{and } \gamma = \gamma(-1) = -1$$

$$a \circ b \circ c \xrightarrow{\text{associativity}} (a \circ b) \circ c \rightarrow (a \circ b) \circ c \rightarrow a \circ (b \circ c) \rightarrow a \circ (c \circ b) \rightarrow a \circ c \circ b \rightarrow$$

$$a \circ a \circ a \circ a \circ a$$

$$\frac{a \circ a}{a \circ a} = \frac{a \circ a}{a \circ a} = a \circ a = (-1)^a = -1$$

$$a \circ a - 1 + a \circ a = 0$$

$$a(a-1)(a+1) \begin{cases} \textcircled{1} a=0 \\ \textcircled{2} a=1 \\ \textcircled{3} a=-1 \end{cases}$$

$$\frac{a \circ a}{(a \circ a)^2} + \frac{a \circ a}{(a \circ a)^2} = 1 \rightarrow \frac{a \circ a}{a \circ a} + \frac{a \circ a}{a \circ a} = 1 \rightarrow \frac{a \circ a + a \circ a}{a \circ a} = 1 \rightarrow \frac{2a \circ a}{a \circ a} = 1 \rightarrow 2a \circ a = a \circ a = 0$$

$$\frac{a \circ a}{a \circ a} = \begin{cases} \textcircled{1} \frac{a \circ a}{a \circ a} = \frac{a \circ a}{a \circ a} = 1 \\ \textcircled{2} \frac{a \circ a}{a \circ a} = \frac{a \circ a}{-1 \circ a} = -1 \end{cases}$$

$$(a+1)(a-1) = 0$$

$$\begin{cases} \textcircled{1} a = -1 \\ \textcircled{2} a = 1 \end{cases}$$

$$a \circ a = \sqrt{a \circ a} \rightarrow (a \circ a)^2 = a \circ a \rightarrow a \circ a = a \circ a \rightarrow a \circ a = 1 \rightarrow a \circ a = a \circ a = 1 \checkmark$$

$$a \circ a \circ a \circ a = 1$$

$$a \circ a \rightarrow a(a) = 1 \rightarrow a = 1$$

$$\frac{1}{a} - \frac{1}{a} = \frac{1}{a}$$