Exercises

3.290 [065]Prerequisites:[064], [01G]. Given sets $A_1, A_2 \ldots$ and $B_1, B_2 \ldots$, for $n \in \mathbb{N}$, say if there is a relation (of equality or containment) between

$$(\liminf_{n\to\infty} A_n) \cap (\liminf_{n\to\infty} B_n) \stackrel{?}{=} \liminf_{n\to\infty}(A_n \cap B_n) \quad , \tag{3.290}$$

$$(\liminf_{n\to\infty} A_n) \cup (\liminf_{n\to\infty} B_n) \stackrel{?}{=} \liminf_{n\to\infty}(A_n \cup B_n) \quad . \tag{3.291}$$

If equality does not hold, show an example. Then use [063] to establish similar rules for $\limsup_{n\to\infty} A_n$.

Solution 1. *[066]*