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Let  $c$  be a limit point of  $\{a_n\}$  and  $d$  be a limit point of  $\{b_n\}$ . Is  $c + d$  necessarily a limit point of  $\{a_n + b_n\}$ ?

Answer: No. Let

$$a_n = \begin{cases} 1 & \text{if } n \text{ is even} \\ n & \text{if } n \text{ is odd} \end{cases}$$

$$b_n = \begin{cases} n & \text{if } n \text{ is even} \\ 1 & \text{if } n \text{ is odd} \end{cases}$$

Then 1 is a limit point of both  $\{a_n\}$  and  $\{b_n\}$ , but  $a_n + b_n = n + 1$  for all  $n$ , so  $\{a_n + b_n\}$  has no (finite) limit point.