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Sumsets with one dense and one infinite summand

When A and B are sets of integers having positive upper Banach density, the sumset $A + B := \{a + b \mid a \in A, b \in B\}$ is highly structured, according to a result proved by Renling Jin and strengthened by Bergelson, Furstenberg, and Weiss. We will see that $A + B$ is still quite structured, even when A is only assumed to be infinite, and B has positive upper Banach density. This is an application of the sharp description of multiple correlation sequences in ergodic theory provided by Bergelson, Host, and Kra.