## Mathematics＞Number Theory

## Badly approximable vectors on a vertical Cantor set

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For $\$ \mathrm{i}, \mathrm{j}>0, \mathrm{i}+\mathrm{j}=1 \$$ ，the set of badly approximable vectors with weight $\$(\mathrm{i}, \mathrm{j})$ $\$$ is defined by $\$ \operatorname{Bad}(\mathrm{i}, \mathrm{j})=\backslash\left\{(\mathrm{x}, \mathrm{y})\right.$ \in $\backslash \mathrm{R}^{\wedge} 2:$ lexists $\mathrm{c}>0$ \forall q lin $\left.\backslash \mathrm{N}, ~ \backslash ;\right\rangle ;$ $\left.\backslash \max \backslash\left\{q\left\|q x\left|\left\|^{\wedge}\{1 / i\}, q\right\| q y\right|\right\|^{\wedge}\{1 / j\} \backslash\right\}>c \mid\right\} \$$ ，where $\$\|x\| \$$ is the distance of $\$ x \$$ to the nearest integer．In 2010 Badziahin－Pollington－Velani solved Schmidt＇s conjecture which was stated in 1982，proving that \＄Bad（i，j）\cap Bad（j，i）\＄is nonempty．Using Badziahin－Pollington－Velani＇s technique with reference to fractal sets，we were able to improve their results：Assume that we are given a sequence $\$\left(\mathrm{i}_{\mathrm{L}} \mathrm{t}, \mathrm{j} \mathrm{t}\right) \$$ with $\$ \mathrm{i} \_\mathrm{t}, \mathrm{j} \_\mathrm{t}>0, \mathrm{i} \mathrm{t}+\mathrm{j} \_\mathrm{t}=1 \$$ ．Then，the intersection of \＄Bad（i＿t，j＿t）\＄over all $t$ is nonempty．

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