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Kahzdan's property (T) for some infinite dimensional topological groups

According to a theorem of Bekka, the unitary group of an infinite dimensional separable Hilbert space equipped with strong operator topology has Kahzdan's property (T). We will analyze Bekka's proof and we will extract a proof of a more general result. One of the corollaries is a new theorem that the infinite symmetric group equipped with natural Polish topology has Kahzdan's property (T); the proof of this theorem uses a result of Lieberman. After that we will discuss some interesting open questions.

This is part of a future PhD thesis written under supervision of Vladimir Pestov and David Handelman.