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W-shaped maps and slope condition for stability of acim

We will talk about W -shaped maps. It was conjectured that instability of the absolutely continuous invariant measure (acim) can result only from the existence of small invariant neighbourhoods of the fixed critical point of the limit map. We will show that the conjecture is not true by constructing a family of W -shaped maps, for which the standard bounded variation method cannot be applied. We then generalize this result. Motivated by the above results, we introduce the harmonic average of slopes condition, which is helpful to deal with the stability for acims of family of piecewise expanding maps.