

## **Abstract**

In this paper, we establish a coupling lemma for standard families in the setting of piecewise expanding interval maps with countably many branches. Our coupling method requires much weaker assumptions than the standard ones for uniformly expanding maps. We further conclude the existence of an absolutely continuous invariant probability measure, the exponential decay of correlations and the almost sure invariance principle (which is a functional version of the central limit theorem) with respect to a large class of unbounded observables. Our approach is particularly powerful for the piecewise expanding maps which do not satisfy the “big image property”. This is a joint work with Hong-Kun Zhang and Yiwei Zhang.