

# Continuous and localized Riesz bases for $L^2$ spaces defined by Muckenhoupt weights

Hugo Aimar <sup>\*</sup>, Wilfredo A. Ramos<sup>†</sup>

## Abstract

Let  $w$  be an  $A_\infty$ -Muckenhoupt weight in  $\mathbb{R}$ . Let  $L^2(wdx)$  denote the space of square integrable real functions with the measure  $w(x)dx$  and the weighted scalar product  $\langle f, g \rangle_w = \int_{\mathbb{R}} fg wdx$ . By regularization of an unbalanced Haar system in  $L^2(wdx)$  we construct absolutely continuous Riesz bases with supports as close to the dyadic intervals as desired. Also the Riesz bounds can be chosen as close to 1 as desired. The main tool used in the proof is Cotlar's Lemma.

**Keyword:** Riesz bases, Haar wavelets, basis perturbations, Muckenhoupt weights, Cotlar's Lemma.

MSC[2010] 42B20, 42C15, 42B25.