A new proof of the weak $(1,1)$ inequality for the dyadic square function

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This project (joint with Paata Ivanisvili and Sasha Volberg) is concerned with finding the (strange) sharp constant in the weak $(1,1)$ inequality for the dyadic square function, using the Bellman function method. This constant was conjectured by Bollobas in the 1980's and proved first by Osekowski using Brownian motion methods. The interesting aspect of our new proof is that it required the invention of a new way to work with Bellman functions – a way which we hope can be implemented in other problems.