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Joseph S. Miller* (jmiller@math.wisc.edu), Department of Mathematics, 480 Lincoln Drive, Madison, WI 53706-1388. *High(CR, MLR) and other properties close to PA.*

An oracle X is High(CR, MLR) if every sequence that is computably random relative to X is Martin-Löf random. It is not hard to show that if X has PA degree, then it computes a martingale dominating the optimal c.e. supermartingale, hence is High(CR, MLR). This was observed by Franklin, Stephan and Yu, who asked if High(CR, MLR) is equivalent to PA. They showed that High(CR, MLR) has measure zero, and that every element computes a Martin-Löf random sequence.

We investigate properties similar to High(CR, MLR), showing that some are equivalent to PA and separating others from PA, but not settling this question for High(CR, MLR). We show that if X computes a martingale that dominates the optimal c.e. supermartingale (or even a fairly tame martingale), then it has PA degree. The same proof can be used to show that every C -compression function has PA degree. On the other side, we construct a K -compression function of non-PA degree. We discuss how to improve that construction to build an X of non-PA degree such that every Π_1^0 class of positive measure contains a decidable $\Pi_1^0[X]$ class of positive measure. This property is implied by High(CR, MLR) but the reverse is open.

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