The reverse mathematics of Cousins lemma

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Cousins lemma is a compactness principle, stating that open covers of a closed interval indexed by reals have finite sub-covers. Cousins lemma is used to develop the gauge integral, a common generalisation of the Lebesgue integral and the improper Riemann integral. Naturally stated it is a third-order statement. In second-order arithmetic, we study the strength of various restrictions of Cousins lemma to classes of countably-coded functions; in particular we look at various levels of the Baire hierarchy of Borel functions.

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