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MEASURABLE DARBOUX FUNCTIONS

Consider the following "topologically defined" classes of functions f : [0,1] -> R,

EXT: f is extendable to a connectivity function g : [0,1]x[0,1] -> R,

AC: f is almost continuous, i.e. every open set containing the graph of f contains the graph of a continuous function with domain [0,1],

Conn: f is a connectivity function, i.e. f|C is connected for every connected subset C of [0,1],

D: f is Darboux, i.e. f(C) is connected for every connected subset C of [0,1],

PC: f is peripherally continuous if for each x and each pair of open sets U and V containing x and f(x), respectively, there is an open subset W of U containing x such that f(bd(W)) is a subset of V,

PR: f has a perfect road at each point if for each x, there is a perfect set having x as a bilateral limit point such that f|P is continuous at x,

Z_c: all sets of the form {f<t} and {f>t} are either empty or bilaterally c-dense in themselves,

Z_ω: all sets of the form {f<t} an {f>t} are either empty or bilaterally dense in themselves.

We discuss the relationships that are known to exist between these "topologically defined" classes of functions within certain "measurability classes":

B_1: Baire class 1,

R_1: pointwise limits of right-continuous functions,

J_1: pointwise limits of functions with only "jump-discontinuities",

G_δ: functions with G_δ graphs,

B: Borel functions,

U: universally measurable functions,