"Non-strict" l'Hospital-Type Rules for Monotonicity: Intervals of Constancy

Abstract:

Assuming that a ``derivative'' ratio $\rho := f'/g'$ of the ratio $r := f/g$ of differentiable functions f and g is strictly monotonic (that is, ρ is increasing or decreasing), it was shown in previous papers that then r can switch at most once, from decrease to increase or vice versa. In the present paper, it is shown that, if ρ is non-strictly monotonic (that is, non-increasing or non-decreasing), then r can have at most one maximal interval of constancy (m.i.c.); on the other hand, any one m.i.c. of a given derivative ratio ρ is the m.i.c. of an appropriately constructed original ratio r.

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