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Section:

8. Analysis

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Hejcman, Jan, University of Education, Hradec Králové, Czech Republic
A description of quasiconvex functions

A real - valued function f is said to he quasiconvex on an interval $J \subset \mathbb{R}$ if $f(tx + (1-t)y) \leq \max\{f(x), f(y)\}$ for each $x, y \in J$, $0 \leq t \leq 1$. A function f is quasiconcave if $-f$ is quasiconvex. Every convex function is quasiconvex. A function is both quasiconvex and quasiconcave if and only if it is monotone.
Theorem. Let a function f be not monotone on an interval J. Then f is quasiconvex on J if and only if there exist disjoint intervals J_1, J_2 such that $J_1 \cap J_2 = J$, $(x \in J_1 \wedge y \in J_2) \Rightarrow x < y$ and f is decreasing on J_1 and increasing on J_2.