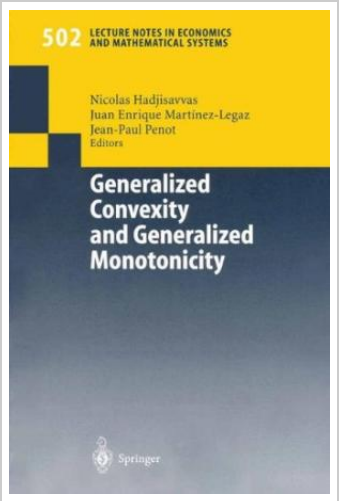

Generalized Convexity and Generalized Monotonicity

By Nicolas Hadjisavvas

Springer Apr 2001, 2001. Taschenbuch. Book Condition: Neu. 235x155x22 mm. Neuware - A famous saying (due toHerriot)definescultureas 'what remainswhen everythingisforgotten '. One couldparaphrase thisdefinitionin statingthat generalizedconvexity iswhat remainswhen convexity has been dropped . Of course, oneexpectsthatsome convexityfeaturesremain.For functions, convexity ofepigraphs(what is above thegraph) is a simplebut strong assumption.It leads tobeautifulpropertiesand to a field initselfcalled convex analysis. In several models, convexity is not presentandintroducing genuine convexityassumptionswouldnotberealistic. A simple extensionof thenotionof convexity consists in requiringthatthe sublevel sets ofthe functionsare convex (recall thata sublevel set offunction a is theportionof thesourcespaceon which thefunctiontakesvalues below a certainlevel).Its first use is usuallyattributed to deFinetti,in 1949. This propertydefinesthe class ofquasiconvexfunctions, which is much larger thanthe class of convex functions: a non decreasingor nonincreasingone variablefunctionis quasiconvex ,as well asanyone-variable functionwhich is nonincreasingon someinterval(-00,a] or(-00,a) and nondecreasingon its complement.Many otherclasses ofgeneralizedconvexfunctionshave been introduced ,often fortheneeds ofvariousapplications: algorithms ,economics, engineering ,management science,multicriteria optimization ,optimalcontrol, statistics .Thus,theyplay animportantrole in severalappliedsciences . A monotonemappingF from aHilbertspace to itself is a mappingfor which the angle between F(x) - F(y) and x- y isacutefor anyx, y. It is well-known thatthegradientof a differentiable convexfunctionis monotone.The class of monotonemappings(and theclass ofmultivaluedmonotoneoperators) has remarkableproperties.This class has beengeneralizedin various direc tions,withapplicationsto partialdifferentialequations ,variationalinequal ities,complementarity problemsand more generally, equilibriumproblems....

Reviews

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