

List of Publications – E.J. Balder (as of Fall 2008)

Excerpts from scientific reviews ...

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- *..uses new very sophisticated techniques.. ..very good results..* (E. Baiada, Zbl. 475.49006).
- *..subsumes several known lower semicontinuity theorems..* (L.D. Berkovitz, MR 82h: 49012).
- *..ingenious proofs..* (M. Valadier, MR 85c: 28004).
- *Such an existence result is very useful in various optimization problems, and the present theorem unifies and improves a variety of available particular results.* (Z. Artstein, MR 85f: 28003).
- *His results appear to generalize the theory of generalized curves and relaxed controls, and are inspired by the techniques of L.C. Young, R.T. Rockafellar and the reviewer..* (J. Warga, MR 85k: 49018).
- *The author extends to Banach spaces the concept of seminormality for finite-dimensional spaces which had been studied by Tonelli (1921), McShane (1934) and the reviewer (1966) .. This is particularly relevant because, by doing so, the author can present a version of the concept which concerns the integrand function .. and a version which concerns the integral ..* (L. Cesari, MR 87e:49032).
- *The proof of measurability of these related set-functions is usually quite involved. The present paper makes such proof unnecessary in many cases..* (E. Roxin, Zbl. 569.49028).
- *This approach is not only quick and elegant but covers also a quite general case..* (A. Kirsch, Zbl. 576.49005).
- *..interesting translation of the classical Tonelli's seminormality..* (C. Vinti, Zbl. 582.49013).
- *..elegant method of proof.., ..beautifully written..* (N.C. Yannelis, MR 90e: 28012).
- *A very ingenious argument..* (M. Valadier, MR 91g: 28008).
- *..considerably extend those of A. Mas-Colell.. a considerable relaxation in the assumptions of Khan-Rustichini..* (T.E. Armstrong, MR 92k: 90135).
- *The appeal of the new proof is .. saving more elaborate functional analysis considerations, employed in earlier proofs..* (Z. Artstein, Zbl. 768.49009).
- *Some interesting examples and counterexamples to earlier results are presented..* (Z. Wyderka, Zbl. 786.49002).
- *.. enlightening style ..* (Z. Artstein, MR 95h:28018)
- *The conditions .. are general enough to subsume practically all the results (that the reviewer is aware of) available in the literature ..* (Z. Artstein, MR 96a:28023)
- *.. sharp results .. scholarly remarks ..* (M. Valadier, MR 98c:49034)
- *.. very general existence results ..* (N. Yannelis, MR 98b:90176)

¹MR = *Mathematical Reviews*,
Zbl. = *Zentralblatt Mathematik*.

Publications:

Games, Equilibrium Theory and Mathematical Economics

- A unifying note on Fatou's lemma in several dimensions, MRC Report #2368, University of Wisconsin, Madison, Mathematics of Operations Research 9 (1984), 267-275.
- More on Fatou's lemma in several dimensions, Canadian Mathematical Bulletin 30 (1987), 334-339.
- Generalized equilibrium results for games with incomplete information, Mathematics of Operations Research 13 (1988), 265-276.
- Fatou's lemma in infinite dimensions, Journal of Mathematical Analysis and Applications 16 (1988), 450-465.
- (with N. C. Yannelis) Random equilibria in generalized continuum games, in: Equilibrium Theory with Infinitely Many Commodities (M.A. Khan, N.C. Yannelis, eds.), Springer-Verlag, Berlin, 1991, pp. 333-350.
- On Cournot-Nash equilibrium distributions for games with differential information and discontinuous payoffs, Economic Theory 1 (1991), 339-354.
- (with N.C. Yannelis) Necessary and sufficient conditions for weak continuity of expected utility functions, Economic Theory 3 (1993), 625-643.
- (with A. Rustichini) An equilibrium result for games with private information and uncountably many players, Journal of Economic Theory 62 (1994), 385-393.
- (with C. Hess) Fatou's lemma for multifunctions with unbounded values, Mathematics of Operations Research 20 (1995), 175-188.
- A unifying approach to existence of Nash equilibria, International Journal of Game Theory 24 (1995), 79-94.
- On the existence of optimal contract mechanisms for incomplete information principal-agent models, Journal of Economic Theory, 68 (1996), 133-148.
- Comments on the existence of equilibrium distributions, Journal of Mathematical Economics 25 (1996), 307-323.
- Remarks on Nash equilibria for games with additively coupled payoffs, Economic Theory 9 (1997), 161-167.
- Young measure techniques for existence of Cournot-Nash-Walras equilibria, in: *Topics in Mathematical Economics and Game Theory* (M. Wooders, ed.), Fields Institute Communications **23**, American Mathematical Society, Providence, 1999, pp. 31-39.
- On the existence of Cournot-Nash equilibria in continuum games, Journal of Mathematical Economics 32 (1999), 207-223.
- On Cournot-Nash equilibrium existence results for games with a measure space of players. Atti del Seminario Matematico e Fisico dell'Universita di Modena 49 (2001), 121-127.
- Incompatibility of the usual conditions for Nash equilibrium existence in continuum economies without ordered preferences, Journal of Economic Theory, 93 (2000), 110-117.
- (with M.R. Pistorius) On an optimal consumption problem for p -integrable consumption plans, Economic Theory, 17 (2001), 721-737.

- A unifying pair of Cournot-Nash equilibrium existence results, *Journal of Economic Theory*, 102 (2002), 437-470.
- A Fatou lemma for Gelfand integrals by means of Young measure theory, *Positivity* 6 (2002), 317-329.
- On the existence of maximum likelihood Nash equilibria. *Annals of Operations Research* 114 (2002), 57-70.
- On undominated Nash equilibria for games with a measure space of players, *Economics Letters* 80 (2003), 137-140.
- An equilibrium existence result for games with incomplete information and indeterminate outcomes, *Journal of Mathematical Economics* 40 (2004), 297-320.
- (with A.R. Sambucini) Fatou's lemma for multifunctions with unbounded values in a dual space, *Journal of Convex Analysis* 12 (2005), 383-395.
- (with N.C. Yannellis) On the continuity of expected utility. In: *Differential Information Economies* (D. Glycopantis et al., editors), *Studies in Economic Theory* 19, Springer-Verlag, Berlin, 2005, pp. 105-124.
- (with N.C. Yannellis) Continuity properties of the private core. *Economic Theory* 29 (2006), 453-464.
- Existence of competitive equilibria in economies with a measure space of consumers and consumption externalities, *Mathematical Institute Preprint* 1294, 2003, *Festschrift for C. Aliprantis*, to appear.
- More on equilibria in competitive markets with externalities and a continuum of agents, *Journal of Mathematical Economics* 44 (2008), 575-602.
- Comments on purification in continuum games, *International Journal of Game Theory* 37 (2008), 73-92.
- (with N.C. Yannellis) Bayesian-Walrasian equilibria: beyond the rational expectations equilibrium, *Journal of Mathematical Economics* 2008, accepted for publication.

Optimal Growth

- An existence result for optimal economic growth problems, *Journal of Mathematical Analysis and Applications* 95 (1983), 195-213.
- Existence of optimal solutions for control and variational problems with recursive objectives, *Journal of Mathematical Analysis and Applications* 178 (1993), 418-437.

Optimal Control

- On a useful compactification for optimal control problems, *Journal of Mathematical Analysis and Applications* 72 (1979), 391-398.
- Relaxed inf-compactness for variational problems by Hilbert cube compactification, *Journal of Mathematical Analysis and Applications* 79 (1981), 1-12.
- Lower semicontinuity of integral functionals with nonconvex integrands by relaxation-compactification, *SIAM Journal of Control and Optimization* 19 (1981), 533-542.
- Lower closure problems with weak convergence conditions in a new perspective, *SIAM Journal of Control and Optimization* 20 (1982), 198-210.

- On lower closure and lower semicontinuity in the existence theory for optimal control, in : System Modelling and Optimization (R.F. Drenick and F. Kozin, eds.), Lecture Notes in Control and Information Sciences No. 38, Springer-Verlag, Berlin, 1982, pp. 158-164.
- Prohorov's theorem for transition probabilities and its application to optimal control, in : Proceedings of the 22nd Conference on Decision and Control, IEEE, 1983, pp. 166-170.
- On existence problems for the optimal control of certain nonlinear integral equations of Urysohn type, Journal of Optimization Theory and Applications 42 (1984), 447-465.
- A general approach to lower semicontinuity and lower closure in optimal control theory, SIAM Journal of Control and Optimization 22 (1984), 570-598.
- Existence results without convexity conditions for general problems of optimal control with singular components, Journal of Mathematical Analysis and Applications 101 (1984), 527-539.
- A general denseness result for relaxed control theory, Bulletin of the Australian Mathematical Society 30 (1984), 463-475.
- On the existence of optimal solutions in a stochastic control model, Journal of Optimization Theory and Applications 45 (1985), 21-31.
- Lower closure for orientor fields by lower semicontinuity of outer integral functionals, Annali di Matematica Pura ed Applicata (IV) 139 (1985), 349-360.
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- Seminormal integral functionals and relaxation, in : Fermat Days : Mathematics for Optimization (J.-B. Hiriart-Urruty, ed.), Mathematical Studies No. 129, North-Holland, Amsterdam, 1986, pp. 43-76.
- On infinite-horizon lower closure results for optimal control, Annali di Matematica Pura ed Applicata (IV) 151 (1988), 239-246.
- Exact bang-bang optimal control for problems with nonlinear costs, in: Advances in Optimization (W. Oettli and D. Pallaschke, eds.), Springer Lecture Notes in Economics and Mathematical Systems 382, Springer, Berlin, 1992, pp. 371-383.
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- New existence results for optimal controls in the absence of convexity: the importance of extremality, SIAM Journal on Control and Optimization 32 (1994), 890-916.
- Existence without convexity in optimal control: an extreme point approach, in: Proceedings Conference on Nonlinear Analysis and Calculus of Variations, Perugia 1993, Atti del Seminario Matematico e Fisico dell'Universita di Modena 42 (1994), 205-217.
- New fundamentals of Young measure theory, in: *Calculus of Variations and Differential Equations* (A. Ioffe, S. Reich and I. Shafrir, eds.), Chapman and Hall/CRC Research Notes in Mathematics **410**, CRC Press, Boca Raton, 2000, 24-48.

- Comment on an existence result for a nonconvex noncoercive variational problem. SIAM Journal on Control and Optimization 40 (2001), 328-332.

Convex Analysis and Measure Theory

- An extension of the essential supremum concept with applications to normal integrands and multifunctions, Bulletin of the Australian Mathematical Society 27 (1983), 407-418.
- On weak convergence implying strong convergence in L_1 -spaces, Bulletin of the Australian Mathematical Society 33 (1986), 363-368.
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- New sequential compactness results for spaces of scalarly integrable functions, Journal of Mathematical Analysis and Applications 151 (1990), 1-16.
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- On equivalence of strong and weak convergence in L_1 -spaces under extreme point conditions, Israel Journal of Mathematics 75 (1991), 21-48.
- On weak convergence implying strong convergence under extremal conditions, Journal of Mathematical Analysis and Applications 163 (1992), 147-156.
- From weak to strong convergence in L_1 -spaces via K -convergence, Annali di Matematica Pura ed Applicata (IV) 165 (1993), 337-349.
- A unified approach to several results involving integrals of multifunctions, Set-Valued Analysis 2 (1994), 63-75.
- (with M. Girardi and V. Jalby) From weak to strong types of \mathcal{L}_E^1 -convergence by the Bocce-criterion, Studia Mathematica 111 (1994), 241-262.
- Connections between recent Olech-type lemmas and Visintin's theorem, in: *Geometry and Nonlinear Control and Differential Inclusions*, Banach Center Publications, Vol. 32 (1995), 47-52.
- (with C. Hess) Two generalizations of Komlos' theorem with lower closure-type applications, Journal of Convex Analysis 3 (1996), 25-44.
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- (with N. Dinh) Some extensions of Berliocchi-Lasry theorem and extremum principles for classes of mathematical programming problems, Vietnam Journal of Mathematics 27 (1999), 23-31.
- Lectures on Young measure theory and its applications in economics, Proceedings Grado School on Measure Theory and Real Analysis, Rendiconti dell'Istituto di Matematico dell'Università di Trieste 31 Suppl. 1 (2000), 1-69
- On ws -convergence of product measures, Mathematics of Operations Research 26 (2001), 494-518.
- (with A.R. Sambucini) A note on strong convergence for Pettis integrable functions, Vietnam Journal of Mathematics 31 (2003), 341-347.
- (with A.R. Sambucini) On weak compactness and lower closure results for Pettis integrable (multi)functions, Bulletin of the Polish Academy of Sciences 52 (2004), 53-61.

Optimization

- Comment on a note on duality gaps in linear programming over convex sets, Journal of Optimization Theory and Applications 17 (1975), 343-346.
- *An extension of duality-stability relations to nonconvex optimization problems*, Doctoral Thesis, University of California, Berkeley, 1976.
- An extension of duality-stability relations to nonconvex optimization problems, SIAM Journal of Control and Optimization 15 (1977), 329-343.
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- Nonconvex duality-stability relations pertaining to the interior penalty function method, Mathematische Operationsforschung und Statistik (Ser. Optimization) 11 (1980), 367-373.
- On a general duality result for moment problems, Mathematische Operationsforschung und Statistik (Ser. Optimization) 18 (1987), 17-21.
- Seminormal functions in optimization theory, in : Nondifferentiable Optimization : Motivations and Applications (V.F. Demyanov and D. Pallaschke, eds.) Lecture Notes in Economics and Mathematical Systems No. 255, Springer-Verlag, Berlin, 1985, pp. 165-169.
- A useful approximation scheme for Lagrangians, Journal of Optimization Theory and Applications 61 (1989), 203-219.

Statistical Decision Theory

- An extension of the usual model in statistical decision theory with applications to stochastic optimization problems, Journal of Multivariate Analysis 10 (1980), 383-397.
- Mathematical foundations of statistical decision theory: a modern viewpoint I, Preprint 199, Department of Mathematics, University of Utrecht.
- (with D.C. Gilliland and J.C. van Houwelingen) On the essential completeness of Bayes empirical Bayes decision rules, Statistics and Decisions 1 (1983), 503-509.
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Stochastic Decision Processes

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- On compactness of the space of policies in stochastic dynamic programming, *Stochastic Processes and Applications* 32 (1989), 141-150.
- Existence without explicit compactness in stochastic dynamic programming, *Mathematics of Operations Research* 17 (1992), 572-580.

Approximation Theory

- (with S. le Cessie) A note on monotone interpolation and smoothing splines, *Numerical Functional Analysis and Optimization* 15 (1994), 47-54.