

Publications of Philip D. Loewen
UBC Mathematics
Version of 5 April 2004

Refereed Journal Publications

1. Greenstadt, E. W., J. V. Olson, P. D. Loewen, H. J. Singer, and C. T. Russell, Correlation of PC 3, 4, and 5 activity with solar wind speed, *Journal of Geophysical Research–Space Physics*, **84**(1979), 6694–6696.
2. Clarke, F. H., and P. D. Loewen, The value function in optimal control: sensitivity, controllability, and time-optimality, *SIAM J. Control Optim.* **24**(1986), 243–263.
3. Loewen, P. D., The proximal normal formula in Hilbert space, *Nonlinear Analysis, Theory, Methods & Applications* **11**(1987), 979–995.
4. Loewen, P. D., On the Lavrentiev phenomenon. *Canadian Math. Bulletin* **30** (1987), 102–108.
5. Loewen, P. D., Existence theory for a stochastic Bolza problem, *IMA J. Mathematical Control and Information* **4**(1987), 301–320.
6. Clarke, F. H., and P. D. Loewen, State constraints in optimal control: a case study in proximal normal analysis, *SIAM J. Control Optim.* **25**(1987), 1440–1456.
7. Loewen, P. D., Parameter sensitivity in stochastic optimal control, *Stochastics* **22**(1987), 1–40.
- *8. Clarke, F. H., and P. D. Loewen, An intermediate existence theory in the calculus of variations, *Annali della Scuola Norm. Sup. Pisa* **16**(1989), 487–526.
9. Loewen, P. D., and R. B. Vinter, Pontryagin-type necessary conditions for differential inclusion problems, *Systems and Control Letters* **9**(1987), 263–265.
10. Loewen, P. D., The proximal subgradient formula in Banach space, *Canadian Math. Bulletin* **31**(1988), 353–361.
11. Clarke, F. H., and P. D. Loewen, Variational problems with Lipschitzian minimizers, *Annales de l’Institut Henri Poincaré—Analyse Non Linéaire* **6sup**(1989), 185–209.
12. Loewen, P. D., F. H. Clarke, and R. B. Vinter, Differential inclusions with free time, *Annales de l’Institut Henri Poincaré—Analyse Non Linéaire* **5**(1988), 573–593.
13. Clarke, F. H., and P. D. Loewen, Intermediate existence and regularity in the calculus of variations, *Applied Math. Letters* **1**(1988), 193–195.
14. Loewen, P. D., Second-order sufficiency criteria and local convexity for equivalent problems in the calculus of variations, *J. Math. Anal. Applic.* **146**(1990), 512–

522.

- *15. Loewen, P. D., and R. T. Rockafellar, The adjoint arc in nonsmooth optimization, *Trans. Amer. Math. Soc.* **325**(1991), 39–72.
- *16. Loewen, P. D., and R. T. Rockafellar, Optimal control of unbounded differential inclusions, *SIAM Journal on Control and Optimization* **32**(1994), 442–470.
- 17. Loewen, P. D., and H. Zheng, Generalized conjugate points for optimal control problems, *Nonlinear Analysis, Theory, Methods, and Applications* **22**(1994), 771–791.
- *18. Loewen, P. D., A mean value theorem for Fréchet subgradients, *Nonlinear Analysis, Theory, Methods, and Applications* **23**(1994), 1365–1381.
- 19. Loewen, P. D., and H. Zheng, Epi-derivatives of integral functionals with applications, *Transactions of the American Mathematical Society* **347**(1995), 443–459.
- *20. Loewen, P. D., and R. T. Rockafellar, New necessary conditions for the Generalized Problem of Bolza, *SIAM Journal on Control and Optimization* **34**(1996), 1496–1511.
- *21. Loewen, P.D., and R. T. Rockafellar, Bolza problems with general time constraints, *SIAM Journal on Control and Optimization* **35**(1997), 2050–2069.
- 22. Borwein, J., M. J. Fabian, I. Kortezov, P. D. Loewen, On the range of the gradient of a continuously differentiable bump, *Journal of Nonlinear and Convex Analysis* **2**(2001), 1–19.
- 23. Loewen, P. D., and X. Wang, Typical properties of Lipschitz functions, *Real Analysis Exchange* **27**(2001), 717–725.
- 24. Loewen, P. D., and X. Wang, A generalized variational principle, *Canadian Journal of Mathematics*, **53**(2001), 1174–1193.
- 25. Borwein, J. M., M. J. Fabian, P. D. Loewen, The range of the gradient of a Lipschitz C^1 -smooth bump in infinite dimensions, *Israel Journal of Mathematics* **132**(2002), 239–251.
- 26. Loewen, P. D., and X. Wang, On the multiplicity of Dini subgradients in separable spaces, *Nonlinear Analysis: Theory, Methods & Applications* to appear. (Accepted 6 April 2004.)

Other Refereed Contributions

1. Loewen, P. D., and R. B. Vinter, Free time optimal control problems with unilateral state constraints. In Bensoussan and Lions, eds., *Analysis and Optimization of Systems*. Springer Lecture Notes in Control and Information Sciences **111**(1988), 349–360.
2. Loewen, P. D., Perturbed differential inclusion problems. In Clarke, Demyanov, and Giannessi, eds., *Nonsmooth Optimization and Related Topics*. New York:

Plenum Press, 1989, pp. 255–264.

3. Loewen, P. D., Limits of Fréchet normals in nonsmooth analysis. In Ioffe, Marcus, and Reich, eds., *Optimization and Nonlinear Analysis*. Harlow, Essex: Longman Higher Education, 1992.

Books

- *1. Loewen, P. D., *Optimal Control via Nonsmooth Analysis*. CRM Proceedings and Lecture Notes in Mathematics, volume 2. Providence, RI: American Math Society, 1993.

Refereed Conference Proceedings

1. Clarke, F.H., and P.D. Loewen, Sensitivity analysis in optimal control, Proceedings of the 23rd I.E.E.E. Conference on Decision and Control, 1649–1654. Las Vegas, Nevada, 12–14 December 1984.
2. Loewen, P.D., State constraints in optimal control, Proceedings of the 25th I.E.E.E. Conference on Decision and Control, 1967–1972. Athens, Greece, 10-12 Dec. 1986.
3. Loewen, P. D., and H. Zheng, Generalized conjugate points in optimal control, Proceedings of the 33rd IEEE CDC, 4004–4008. Orlando, Florida, 14–16 December 1994.
4. Hu, Z., S. E. Salcudean, and P. D. Loewen, Numerical solution of the multiple objective control system design problem for SISO systems, in *Proceedings of the American Control Conference ACC-95*, pp. 1458–1462, Seattle, Washington, U.S.A., June 21-23, 1995.
5. Hu, Z., S. Salcudean, and P. Loewen, Robust controller design for teleoperation systems, IEEE International Conference on Systems, Man, and Cybernetics, Vancouver, BC, Canada, October 1995, vol. 3, 2127–2132.
6. Salcudean, S., J. Yan, Z. Hu, and P. Loewen, Performance trade-offs in optimization-based teleoperation controller design with applications to microsurgery experiments, Proceedings of the International Mechanical Engineering Congress and Exposition, 12–17 November 1995, DSC-vol 57-2, 631–640.
7. Hu, Z., S. Salcudean and P. Loewen, Multiple objective control problems via nonsmooth analysis, Preprints of the 13th IFAC World Congress, San Francisco, USA, July 1996, vol. C, 415–420.
8. Salcudean, S., Z. Hu and P. Loewen, Optimization-based teleoperation controller design, Preprints of the 13th IFAC World Congress, San Francisco, USA, July 1996, vol. D, 405–410.
9. Hu, Z., P. D. Loewen, and S. E. Salcudean, Minimax linear-quadratic controller design, in *Systems modelling and optimization. Proceedings of the 18th IFIP TC7 Conference held in Detroit, MI, July 22–25, 1997*. Edited by Michael P.

Polis, Asen L. Dontchev, Peter Kall, Irena Lasiecka and Andrzej W. Olbrot. Chapman & Hall/CRC Research Notes in Mathematics **396**(1999), 117–125.

10. Loewen, P. D., R. B. Vinter, and H. Zheng, Necessary conditions in optimal control without differentiability, Proceedings of the 37th IEEE Conference on Decision and Control, Tampa, FL, USA, 16–18 December 1998, pages 19–24.
11. Loewen, P. D., and X. Wang, Applications of a generalized variational principle. Extended abstract for the Summer Symposium in Real Analysis XXIV, University of North Texas, Denton, TX, USA, 23–27 May 2000. To appear in *Real Analysis Exchange* **27**(2001).
12. Loewen, P. D., S. J. Watson, and P. R. Wolenski, A variational problem with a continuum of weak local minima, 4 pages, Proceedings of the 41st IEEE Conference on Decision and Control, Las Vegas, NV, USA, 10-13 December 2002.

Non-Refereed Publications

1. Loewen, P. D., et. al., Optimal lumber production from softwood sawlogs, in A. Peirce, ed., *Proceedings of the First PIMS Industrial Problem Solving Workshop*, Vancouver, 1997, Chapter 3, 43–59.

Theses Supervised

1. Zheng, Harry H., *Second-Order Necessary Conditions in Optimal Control*, Ph.D. thesis, UBC, July 1993.
2. Liu, Yidong, *Joint and Cooperative Inversion of Geophysical Data*, M.Sc. thesis, UBC, December 1994.
3. Patrick, Jonathan, *Convergence of Behaviour Rules in Iterated Matrix Games*, M.Sc. thesis, UBC, November 1999.

Work in Progress

1. Fabian, M. J., P. D. Loewen, and B. Sh. Mordukhovich, Subdifferential calculus in Asplund-generated spaces, 12 manuscript pages, completion target spring 2004.