

- **Books**

- [B1] Pavel, L., *Game Theory for Control of Optical Networks*, Birkhäuser-Springer Science, ISBN 978-0-8176-8321-4, June 2012.

- **Refereed Journal Publications**

- [SJ1] Gao, B. and L. Pavel, “On Passivity, Reinforcement Learning and Higher-Order Learning in Multi-Agent Finite Games,” submitted to *IEEE Transactions on Automatic Control*.
- [SJ2] Pavel, L., “Distributed GNE seeking under partial-decision information over networks via a doubly-augmented operator splitting approach, ” submitted to *IEEE Transactions on Automatic Control*.
- [SJ3] Salehisadaghiani, F. and L. Pavel, “Nash Equilibrium Seeking with Non-doubly Stochastic Communication Weight Matrix,” *EAI Transactions on Collaborative Computing - Special Issue*, to appear.
- [J41] Yi, P. and L. Pavel, “Asynchronous distributed algorithms for seeking generalized Nash equilibria under full and partial decision information,” accepted, *IEEE Transactions on Cybernetics*.
- [J40] Das Gupta, S. and L. Pavel, “On seeking efficient Pareto optimal points in multi-player minimum cost flow problems with application to transportation systems”, accepted, *Journal of Global Optimization*.
- [J39] Yi, P. and L. Pavel, “An operator splitting approach for distributed generalized Nash equilibria computation,” accepted, *Automatica*.
- [J38] Salehisadaghiani, F., Shi, W. and L. Pavel, “Distributed Nash Equilibrium Seeking via ADMM,” accepted, *Automatica*.
- [J37] Gadjov, D. and L. Pavel, “A Passivity-Based Approach to Nash Equilibrium Seeking over Networks,” *IEEE Transactions on Automatic Control*, DOI: 10.1109/TAC.2018.2833140.
- [J36] Yi, P. and L. Pavel, “Distributed generalized Nash equilibria computation of monotone games via double-layer preconditioned proximal-point algorithms,” *IEEE Transactions on Control of Network Systems*, DOI:10.1109/TCNS.2018.2813928.
- [J35] Salehisadaghiani, F., and L. Pavel, “Distributed Nash Equilibrium Seeking in Networked Graphical Games,” *Automatica*, vol 87, pp. 17 - 24, 2018.
- [J34] Salehisadaghiani, F., and L. Pavel, “Distributed Nash Equilibrium Seeking: A Gossip-Based Algorithm,” *Automatica*, vol 72, pp. 209 - 216, 2016.
- [J33] Kvaternik, K., Llorca J., Kilper D. and L. Pavel, “A Methodology for the Design of Self-Optimizing, Decentralized Content-Caching Strategies,” *IEEE/ACM Trans. on Networking*, vol. 24 , no. 5, 2634 - 2647, 2016.
- [J32] Pashaie, A, Pavel, L. and C. J. Damaren, “A Population Game Approach for Dynamic Resource Allocation Problems,” *International Journal of Control*, vol 90 no. 9, pp. 1957-1972, 2017.

- [J31] Das Gupta, S., J. K. Tobin and L. Pavel, "A Two-Step Linear Programming Model for Energy-Efficient Timetables in Metro Railway Networks," *Transportation Research Part B*, 93, 57-74, 2016.
- [J30] Binette, M. R., Damaren C. J. and L. Pavel, "Nonlinear H_∞ Attitude Control using Modified Rodrigues Parameters," *Journal of Guidance, Control, and Dynamics*, Sept. 2014, DOI: 10.2514/1.G000511.
- [J29] Wang, Z., Tsai, J., Pan, Y. Kilper D. and L. Pavel, "Stability Analysis in a ROADM-based multi-channel quasi-ring optical network," *Opt. Fiber Technology*, vol. 21, 40-50, 2015.
- [J28] Binette, M. R., Damaren C. J. and L. Pavel, "Attitude Control of Earth-Pointing Spacecraft Using Nonlinear H_∞ Control," *Proc. IMechE (G): Journal of Aerospace Engineering*, vol. 228, no. 12, 2192-2206, 2014.
- [J27] Wang, Z., Tsai, J., Pan, Y. Kilper D. and L. Pavel, "Control for Suppression of Channel Power Excursions in ROADM-based WDM Chain Networks," *IEEE Journal of Lightwave Technology*, vol. 32, no. 2, pp. 293-302, Jan. 2014.
- [J26] Pan, Y. and L. Pavel, "OSNR Game Optimization with Link Capacity Constraints in General Topology WDM Networks," *Optical Switching and Networking*, vol. 11, Part A, pp. 1-15, Jan. 2014.
- [J25] Pavel, L., "Classical Solutions in Sobolev Spaces for A Class of Hyperbolic Lotka-Volterra Systems," *SIAM J. on Control and Optimization*, vol. 51, no. 3, pp. 2132-2151, 2013.
- [J24] Stefanovic, N. and L. Pavel, "Robust power control of multi-link single-sink optical networks with time-delays," *Automatica*, vol. 49, issue 7, pp. 2261-2266, 2013.
- [J23] Pavel, L., and L. Chang, "Lyapunov-based boundary control for a class of hyperbolic Lotka-Volterra systems," *IEEE Transactions on Automatic Control*, vol. 57, no. 3, pp. 701-714, March 2012.
- [J22] Stefanovic, N. and L. Pavel, "A Lyapunov-Krasovskii stability analysis for game-theoretic based power control in optical links, *J. of Telecommunications Systems*, vol. 47, no. 1, pp.19-33, 2011.
- [J21] Pan, Y. , Alpcan T. and L. Pavel, "A System performance approach to OSNR optimization in optical networks," *IEEE Transactions on Communications*, vol. 58, no. 4, pp. 1193-1200, April 2010.
- [J20] Pan, Y. and L. Pavel, "Games with coupled propagated constraints in optical networks with multi-link topologies," *Automatica*, vol. 45, issue 4, pp. 871 - 880, April 2009.
- [J19] Stefanovic, N. and L. Pavel, "A stability analysis with time-delay of primal-dual power control in optical links," *Automatica*, vol. 45, issue 5, pp. 1319-1325, May 2009.

- [J18] Zhu, Q. and L. Pavel, "Enabling differentiated services using generalized power control model in optical networks," *IEEE Transactions on Communications*, vol. 57, no 9, pp. 2570-2575, Sept. 2009.
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- [J16] Stefanovic, N. and L. Pavel, "An analysis of stability with time-delay of link level power control in optical networks," *Automatica*, vol. 45, issue 1, pp. 149-154, January 2009.
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- [J13] Akhtar, A., L. Pavel and S. Kumar, "Modeling inter-channel FWM with walk-off in RZ-DPSK single span links," *IEEE Journal of Lightwave Technology*, vol., no. 14, pp. 2142 - 2154, July, 2008.
- [J12] Pavel, L., "An extension of duality to a game-theoretic framework," *Automatica*, vol. 43, no. 2, pp. 226-237, Feb. 2007.
- [J11] Kuntze, S. B., L. Pavel and J. S. Aitchison, "Controlling a multi-quantum-well semiconductor optical amplifier," *IEEE Journal of Quantum Electronics*, vol. 43, no. 2, pp. 123-129, Feb 2007.
- [J10] Akhtar, A., L. Pavel and S. Kumar, "Modeling and analysis of the contribution of channel walk-off to non-degenerate and degenerate Four-Wave-Mixing Noise in RZ-OOK optical transmission systems," *IEEE Journal of Lightwave Technology*, vol. 24, no. 11, pp. 4269-4285, Nov. 2006.
- [J9] Pavel, L., "A nested noncooperative OSNR game in distributed WDM optical links," *IEEE Transactions on Communications*, vol. 55, no. 6, pp. 1220-1230, June 2007.
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- [J7] Taing, Y. and L. Pavel, "An EDFA H_∞ controller for suppression of power excursions due to pilot tones and network traffic," *IEEE Photonics Technology Letters*, vol. 18, no. 18, pp. 1916-1918, Sept 2006.

- [J6] Pavel, L., “A noncooperative game approach to OSNR optimization in optical networks,” *IEEE Transactions on Automatic Control*, vol. 51, no. 5, pp. 848-852, May 2006.
- [J5] Pavel, L., “OSNR optimization in optical networks: Modeling and distributed algorithms via a central cost approach,” *IEEE Journal on Selected Areas in Communications*, vol. 24, no. 4, part supplement, pp. 54-65, April 2006.
- [J4] Pavel, L., “Dynamics and stability in optical communication networks: A system theoretic framework,” *Automatica*, vol. 40, no.8, pp. 1361-1370, Aug. 2004.
- [J3] Pavel, L., and F. W. Fairman, “Nonlinear H_∞ control: a J-dissipative approach,” *IEEE Transactions on Automatic Control*, Vol. 42, No. 12, pp. 1636-1653, Dec. 1997.
- [J2] Pavel, L., and F. W. Fairman, “Controller reduction for nonlinear plants - an L_2 approach,” *Int. J. Robust and Nonlinear Control*, Vol. 7, Issue 5, pp. 475-505, May 1997.
- [J1] Pavel, L., and F. W. Fairman, “Robust stabilization of nonlinear plants - an L_2 approach,” *Int. J. Robust and Nonlinear Control*, Vol. 6, Issue 7, pp. 691-726, Aug. 1996.
- **Refereed Conference Papers (selected 2005-2018)**
- [C77] Gao, B. and L. Pavel, “On Passivity and Reinforcement Learning in Finite Games,” in *Proc. 57th IEEE Conference on Decision and Control (CDC)*, to appear, December 2018.
- [C76] Pavel, L., “A doubly-augmented operator splitting approach for distributed GNE seeking over networks,” in *Proc. 57th IEEE Conference on Decision and Control (CDC)*, to appear, invited paper, December 2018.
- [C75] Romano, A.R. and L. Pavel, “Dynamic Gradient Play for NE Seeking with Disturbance Rejection,” in *Proc. 57th IEEE Conference on Decision and Control (CDC)*, to appear, December 2018.
- [C74] Yi, P. and L. Pavel, “Asynchronous distributed algorithm for seeking generalized Nash equilibria,” in *Proc. European Control Conference (ECC)*, p. 2164-2169, invited paper, June 2018.
- [C73] Yi, P. and L. Pavel, “Distributed seeking for generalized Nash equilibria of monotone games via preconditioned proximal algorithms,” in *Proc. American Control Conference (ACC)*, June 2018.
- [C72] Gadjov, D. and L. Pavel, “Continuous-time Distributed Dynamics for Nash Equilibrium over Networks via a Passivity-Based Control Approach,” in *Proc. 56th IEEE Conference on Decision and Control (CDC)*, p. 4600-4605, invited paper, December 2017.
- [C71] Yi, P. and L. Pavel, “A distributed primal-dual algorithm for computation of generalized Nash equilibria via operator splitting methods,” in *Proc. 56th IEEE Conference on Decision and Control (CDC)*, p. 3841-3846, invited paper, December 2017.
- [C70] Salehisadaghiani, F. and L. Pavel, “Distributed Nash Equilibrium Seeking via the Alternating Direction Method of Multipliers,” *Proc. 20th IFAC World Congress*, IFAC PapersOnLine, 50(1), p. 6166-6171, July 2017.

- [C69] Hasanbeig, M.H. and L. Pavel, “On synchronous Binary Log-Linear Learning and Second Order Q-Learning,” *Proc. 20th IFAC World Congress*, IFAC PapersOnLine, 50(1), p. 8987-8992, July 2017.
- [C68] Salehisadaghiani, F. and L. Pavel, “Nash Equilibrium Seeking with Non-doubly Stochastic Communication Weight Matrix,” in *Proc. of 7th EAI International Conference on Game Theory for Networks, May 2017*, Lecture Notes of the Institute for Computer Sciences, Social Informatics and Telecommunications Engineering, LNICST 212, p. 3-15, Springer, May 2017.
- [C67] Shi, W. and L. Pavel, “LANA: an ADMM-like Nash Equilibrium Seeking Algorithm in Decentralized Environment,” in *Proc. American Control Conference*, p. 285-290, Seattle, May 2017.
- [C66] Hasanbeig, M.H. and L. Pavel, “Distributed Coverage Control by Robot Networks in Unknown Environments Using a Modified Expectation Maximization (EM) Algorithm,” in *Proc. 19th International Conference on Machine Learning and Pattern Recognition*, p. 828-836, July 2017.
- [C65] Salehisadaghiani, F. and L. Pavel, “Distributed Nash Equilibrium Seeking By Gossip in Games on Graphs,” in *Proc. 55th IEEE Conference on Decision and Control*, p. 6111-6116, invited paper, December 2016.
- [C64] Das Gupta, S. and L. Pavel, “Multi-player minimum cost flow problems with nonconvex costs and integer flows,” in *Proc. 55th IEEE Conference on Decision and Control*, p. 7617-7622, December 2016.
- [C63] Pashaie, A, Pavel, L. and C. J. Damaren, “A Population Game Approach for Resource Allocation,” in *Proc. American Control Conference*, Chicago, June 2015.
- [C62] Das Gupta, S., Pavel, L., and J. K. Tobin, “An Optimization Model to Utilize Regenerative Braking Energy in a Railway Network,” in *Proc. American Control Conference*, Chicago, June 2015.
- [C61] Salehisadaghiani, F. and L. Pavel, “Nash Equilibrium Seeking By a Gossip-Based Algorithm,” in *Proc. 53rd IEEE Conference on Decision and Control*, Dec. 2014.
- [C60] Wang, Y. and L. Pavel, “A Modified Q-Learning Algorithm for Potential Games,” in *Proc. of the 19th IFAC World Congress*, Cape Town, Aug. 2014.
- [C59] Beauchamp, D. and L. Pavel, “Lyapunov-based Boundary Control for a MIMO Counter-Propagating Raman Amplifier,” in *Proc. of the 19th IFAC World Congress*, Cape Town, Aug. 2014.
- [C58] Wang. Z., Tsai, J., Pan, Y., Kilper. D. C., and L. Pavel, “Stability Analysis in a Multi-Channel Quasi-Ring Optical Network,” in *Proc. American Control Conference*, Portland, June, 2014.
- [C57] Kvaternik, K., Llorca J., Kilper D. and L. Pavel, “Decentralized Caching Strategies for Energy-Efficient Content Delivery,” in *Proc. IEEE ICC 2014, Sel. Areas in Comm. Symposium, Green Comm. and Computing*, Sydney, June 2014.

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- [C55] Das Gupta, S. and L. Pavel, “A Stackelberg Game Model for Plug-in Electric Vehicles in a Smart Grid,” in *Proc. 51st Allerton Conference on Communication, Control, and Computing*, Allerton, Oct. 2013.
- [C54] Kvaternik, K. and L. Pavel, “An analytic framework for decentralized extremum seeking control,” in *Proc. American Control Conference*, Montreal, June 2012.
- [C53] Wang. Z., Tsai, J., Pan, Y., Kilper. D. C., and L. Pavel, Oscillation analysis for a quasi-ring optical network, *Proc. American Control Conference*, Montreal, June 2012.
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- [C51] Kvaternik, K. and L. Pavel, “Interconnection conditions for the stability of nonlinear sampled-data extremum seeking schemes ” in *Proc. 50th IEEE Conference on Decision and Control*, Orlando, Dec. 2011.
- [C50] Pavel, L., “Global classical solvability of initial-boundary problems for hyperbolic Lotka-Volterra systems in Sobolev spaces, ” in *Proc. 48th IEEE Conference on Decision and Control*, 5514-5519, Shanghai, Dec. 2009.
- [C49] Alpcan T., L. Pavel and N. Stefanovic, “A control theoretic approach to noncooperative game design , ” in *Proc. 48th IEEE Conference on Decision and Control*, 8575-8580, Shanghai, Dec. 2009.
- [C48] Stefanovic, N. and L. Pavel, “Robust power control of single sink optical networks with time-delays, ” in *Proc. 48th IEEE Conf. on Decision and Control*, 2034-2039, Dec. 2009.
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- [C46] Stefanovic, N. and L. Pavel, “Robust power control of optical links with time-delay, ” in *European Control Conference*, Budapest, Aug. 2009.
- [C45] Alpcan, T. and L. Pavel, “Nash equilibrium design and optimization, ” in *Proc. 1st Int. Conference on Games in Networks (GameNets2009)*, 164 - 170, Istanbul, May 2009.
- [C44] Pan, Y., T. Alpcan and L. Pavel, “Effects of parameters on Nash games with OSNR target, ” in *Proc. 2nd Int. Workshop on Game Theory for Communications (ValueTools)*, Athens, Oct. 2008.

- [C43] Stefanovic, N. and L. Pavel, “A Lyapunov-Krasovskii stability analysis for game-theoretic based power control in optical networks,” in *Proc. 2nd Int. Workshop on Game Theory for Communications (ValueTools)*, Athens, Oct. 2008.
- [C42] Pan, Y., T. Alpcan and L. Pavel, “A distributed optimization approach to constrained OSNR problem,” in *Proc. IFAC World Congress*, Seoul, July 2008.
- [C41] Stefanovic, N. and L. Pavel, “Primal-dual power control of optical networks with time-delay”, in *Proc. IFAC World Congress*, Seoul, July 2008.
- [C40] Zhu, Q. and L. Pavel, “State-space approach to pricing design in OSNR Nash game”, in *Proc. IFAC World Congress*, Seoul, July 2008.
- [C39] Zhu, Q. and L. Pavel, “Service differentiation via power management in WDM optical networks,” in *Proc. IEEE Int. Conference on Communications ICC*, Beijing, May 2008.
- [C38] Zhu, Q. and L. Pavel, “Linear non-cooperative games with linearly coupled constraints: theory and application,” in *Proc. Workshop on Optical Networks and Switching, INFO-COM*, Seattle, April 2008.
- [C37] Kuntze, S. B., B. Zhang, L. Pavel and J. S. Aitchison, “Analysis of feedback stability under delay for semiconductor optical amplifier control circuits,” in *Proc. American Control Conference*, June 2008.
- [C36] Zhu, Q. and L. Pavel, “A Stackelberg game approach for link power control in optical links,” in *Proc. American Control Conference*, June 2008.
- [C35] Stefanovic, N. and L. Pavel, “Link power control of optical networks with time-delay,” in *Proc. 46th IEEE Conference on Decision and Control*, New Orleans, Dec 2007.
- [C34] Pan, Y. and L. Pavel, “Games with coupled propagated constraints in optical networks: the multi-link case,” in *Proc. 46th IEEE Conf. on Decision and Control*, Dec 2007.
- [C33] Kuntze, S. B., L. Pavel and J. S. Aitchison, “Novel control of semiconductor optical amplifier,” in *Proc. 20th IEEE Annual Lasers and Electro Optics Society (LEOS)*, Florida, Oct 2007.
- [C32] Zhu, Q., and L. Pavel, “Constrained OSNR optimization in optical networks with a fictitious player,” in *Proc. 4th IEEE International Conference on Broadband Communications, Networks and Systems (BroadNets)*, Raleigh, Sept. 2007.
- [C31] Kuntze, S. B., L. Pavel and J. S. Aitchison, “Novel control of semiconductor optical amplifier,” in *Proc. 4th IEEE International Conference on Broadband Communications, Networks and Systems (BroadNets)*, Raleigh, Sept. 2007.

- [C30] Zhu, Q. and L. Pavel, “End-to-end link power control in optical networks using Nash bargaining solution,” in *Proc. International Workshop on Game Theory for Communications*, (in ValueTools), Nantes, Oct 2007.
- [C29] Pan, Y. and L. Pavel, “Global convergence of an iterative gradient algorithm for the Nash equilibrium in an extended OSNR game, ” in *Proc. IEEE INFOCOM Conference*, pp. 206-212, May 2007.
- [C28] Pan, Y. and L. Pavel, “Iterative algorithms for Nash equilibrium of an extended OSNR optimization game,” in *Proc. Int. Conference on Networking*, April 2007.
- [C27] Akhtar, A., L. Pavel and S. Kumar, “Impact of walk-off on FWM in RZ-OOK transmission,” in *Proc. IEEE Optical Fiber Conference (OFC/NFOEC)*, March 2007.
- [C26] Pavel, L., “Hierarchical iterative algorithm for a coupled constrained OSNR Nash game, ” in *Proc. IEEE Global Communications Conference*, San Francisco, Nov. 2006.
- [C25] Stefanovic, N. and L. Pavel, “Application of robust L_2 control to Erbium-doped fiber amplifier: input and state uncertainty,” in *Proc. IEEE Conf. on Control Applications*, pp. 686-692, Oct. 2006.
- [C24] Taing, Y. and L. Pavel, “Application of H_∞ control for suppression of power excursions due to pilot tones and network traffic in optical amplifiers,” in *Proc. American Control Conference*, pp. 6088-6094, June 2006.
- [C23] Pavel, L., “An extension of duality and hierarchical decomposition to a game-theoretic framework,” in *Proc. 44th IEEE Conf. on Decision and Control*, 5317-5323, Dec 2005.
- [C22] Pavel, L., “A nested noncooperative game formulation for OSNR optimization in distributed optical links,” in *Proc. 44th IEEE Conf. on Decision and Control*, pp. 6958-6965, Dec. 2005.

Plenary Talks

- [P1] “On Nash’s game theory and its extension to networks, *7th IFAC Workshop on Distributed Estimation and Control in Networked Systems (NecSys18)*, Groningen, NE, August 2018.

Invited Talks and Papers

- [I12] L. Pavel, “On incremental passivity in network games,” *NETwork Games, COntrol and OPTimization (NETGCOOP)*, New York, Nov 2018.
- [I11] Yi, P. and L. Pavel, “Asynchronous distributed algorithm for seeking generalized Nash equilibria,” *European Control Conference (ECC)*, Cyprus, June 2018.

- [I10] Yi, P. and L. Pavel, "A distributed primal-dual algorithm for computation of generalized Nash equilibria via operator splitting methods," *56th IEEE Conference on Decision and Control*, Melbourne, December 2017.
- [I9] Gadjov, D. and L. Pavel, "Continuous-time Distributed Dynamics for Nash Equilibrium over Networks via a Passivity-Based Control Approach," *56th IEEE Conference on Decision and Control*, Melbourne, December 2017.
- [I8] Farzad Salehisadaghiani and L. Pavel, "Distributed Nash Equilibrium Seeking By Gossip in Games on Graphs," *55th IEEE Conference on Decision and Control*, to be held December 2016.
- [I7] Pashaie, A., Pavel, L. and C. J. Damaren, "An Evolutionary Game Approach for Resource Allocation," *Applied Mathematics, Modeling and Computational Science Congress*, Waterloo, June 2015.
- [I6] Pavel, L. Towards Decentralized Optimization of Dynamic Multi-Agent Networks, *IMSE Summer School on Multi-Agent Networked Systems*, UIUC, August, 2013.
- [I5] Kvaternik, K., J. Llorca, D. Kilper and L. Pavel, A decentralized scheme for optimization of a multi-agent system, *50th Allerton Conference*, Allerton, Oct 2012.
- [I4] Kvaternik, K. and L. Pavel, A continuous-time decentralized optimization scheme with positivity constraints, *51st IEEE Conference on Decision and Control*, Maui, Dec 2012.
- [I3] Pan, Y. and L. Pavel, Games with Coupled Propagated Constraints in General Topology Optical Networks, *1st Int. Conference on Games in Networks*, Istanbul, May 2009.
- [I2] Pan, Y. and L. Pavel, Games with coupled propagated constraints in optical networks: the multi-link case, *46th IEEE Conference on Decision and Control*, Dec 2007.
- [I1] Pan, Y. and L. Pavel, OSNR Optimization with Link Capacity Constraints in WDM Networks: A Cross Layer Game Approach, *Optical Symposium, 4th IEEE Int. Conf. on Broadband Communications, Networks and Systems*, Sept. 2007.
- **Granted Patents**
- [L5] Bosloy, J. & L. Pavel, "Coordinated control of dynamic gain equalization in a wavelength division multiplexed optical system," Issued July 2006, *U.S. Patent 7,081,987*.
- [L4] Harley, J. & L. Pavel, "Optical Waveform for use in a DWDM Optical Network and Systems for Generating & Processing Same," Issued March 2007, *U.S. Patent 7,197,243*.
- [L3] Bosloy, J., L. Pavel, C. Parsier & M. Brown, "Apparatus and Method for Planned Wavelength Addition and Removal, from a Wavelength Division Multiplexed System," Issued June 2006, *U.S. Patent 7,058,301*.
- [L2] Pavel, L. & A. Robinson, "Dynamic Optical Spectral Control Scheme for Optical Amplifier Sites," Issued Feb 2005, *U.S. Patent 6,856,454*.
- [L1] Pavel, L. & X. Meng, "Optical Power Transient Control Scheme for EDFA Amplifiers," Issued June 2004, *U.S. Patent 6,757,099*.