
BIBLIOGRAPHY

- [Acharya, Buckley 85] Acharya, S., Buckley, G. Transaction Restarts in Prolog Database Systems. In *Proc. ACM-SIGMOD Int'l Conf. on Management of Data*, pages 364–373. Austin, TX, May, 1985.
- [Agrawal et al. 86] Agrawal, D., Bernstein, A.J., Gupta, P., Sengupta, S. Distributed Multi-Version Optimistic Concurrency Control for Relational Databases. In *Proc. 1986 COMPCON*, pages 416–421. IEEE, San Francisco, March, 1986.
- [Agrawal, Carey, Livny 85] Agrawal, R., Carey, M.J., Livny, M. Models for Studying Concurrency Control Performance: Alternatives and Implications. In *Proc. ACM SIGMOD Int'l Conf. on Management of Data*, pages 108–121. Austin, TX, May, 1985.
- [Agrawal, DeWitt 85a] Agrawal, R., DeWitt, D.J. Recovery Architectures for Multi-processor Database Machines. In *ACM-SIGMOD Int'l Conf. of Management of Data*, pages 131–147. Austin, TX, May, 1985.
- [Agrawal, DeWitt 85b] Agrawal, R., DeWitt, D.J. Integrated Concurrency Control and Recovery Mechanisms: Design and Performance Evaluation. *ACM Trans. on Database Systems* 10(4):529–564, December, 1985.
- [Allchin, McKendry 83] Allchin, J.E., McKendry, M.S. Synchronization and Recovery for Actions. In *Proc. 2nd ACM SIGACT-SIGOPS Symp. on Principles of Distributed Computing*, pages 31–44. Montreal, August, 1983.
- [Alsberg, Day 76a] Alsberg, P.A., Day, J.D. A Principle for Resilient Sharing of Distributed Resources. In *Proc. 2nd Int'l Conf. on Software Engineering*. IEEE, October, 1976.
- [Alsberg et al. 76b] Alsberg, P.A., Belford, G.G., Day, J.D., Grapa, E. *Multi-copy Resiliency Techniques*. Technical Report CAC Document No. 202, Center for Advanced Computation, University Illinois at Urbana-Champaign, May, 1976.
- [Anderson, Lee 81] Anderson, T., Lee, P.A. *Fault Tolerance Principles and Practice*. Prentice-Hall, Englewood Cliffs, NJ, 1981.

- [Andler et al. 82] Andler, S., Ding, I., Eswaran, K., Hauser, C., Kim, W., Mehl, J., Williams, R. System D: A Distributed System for Availability. In *Proc. 8th Int'l Conf. on Very Large Data Bases*, pages 33–44. Mexico City, September, 1982.
- [Attar, Bernstein, Goodman 84] Attar, R., Bernstein, P.A., Goodman, N. Site Initialization, Recovery and Back-up in a Distributed Database System. *IEEE Trans. on Software Engineering* SE-10(6):645–650, November, 1984.
- [Badal 79] Badal, D.Z. Correctness of Concurrency Control and Implications in Distributed Databases. In *Proc. IEEE COMPSAC Conf.*, pages 588–593. November, 1979.
- [Badal 80a] Badal, D.Z. On the Degree of Concurrency Provided by Concurrency Control Mechanisms for Distributed Databases. In *Proc. Int'l Symp. Distributed Databases*, pages 35–48. North-Holland, Amsterdam, March, 1980.
- [Badal 80b] Badal, D.Z. The Analysis of the Effects of Concurrency Control on Distributed Data Management and Computer Networks. In *Proc. 6th Int'l Conf. on Very Large Data Bases*. Montreal, 1980.
- [Badal 81] Badal, D.Z. Concurrency Control Overhead or Closer Look at Blocking vs. Nonblocking Concurrency Control Mechanisms. In *5th Int'l Conf. on Distributed Data Management and Computer Networks*. 1981. Originally published as Technical Report No. NPS52-81-005, Naval Postgraduate School, Monterey, CA, June, 1981.
- [Badal, Popek 78] Badal, D.Z., Popek, G.J. A Proposal for Distributed Concurrency Control for Partially Redundant Distributed Database Systems. In *Proc. 3rd Berkeley Workshop on Distributed Data Management and Computer Networks*, pages 273–288. ACM/IEEE, 1978.
- [Balter, Berard, Decitre 82] Balter, R., Berard, P., Decitre, P. Why Control of Concurrency Level in Distributed Systems is More Fundamental than Deadlock Management. In *Proc. 1st ACM SIGACT-SIGOPS Symp. on Principles of Distributed Computing*, pages 183–193. Ottawa, August, 1982.
- [Barbara, Garcia-Molina 84] Barbara, D., Garcia-Molina, H. The Vulnerability of Voting Mechanisms. In *Proc. 4th Symp. on Reliability in Distributed Software and Database Systems*, pages 45–53. IEEE, Silver Spring, MD, 1984.
- [Bartlett 82] Bartlett, J.F. A “NonStop” Operating System. *The Theory and Practice of Reliable System Design*. Digital Press, Bedford, MA, 1982, pages 453–460. D. Siewiorek and R. Swarz (eds.).
- [Bayer 83] Bayer, R. Database System Design for High Performance. In *Proc. IFIP 9th World Computer Congress*, pages 146–155. North-Holland, Amsterdam, September, 1983.
- [Bayer et al. 80a] Bayer, R., Elhardt, E., Heller, H., Reiser, A. Distributed Concurrency Control in Database Systems. In *Proc. 6th Int'l Conf. on Very Large Data Bases*, pages 275–284. Montreal, 1980.
- [Bayer, Heller, Reiser 80b] Bayer, R., Heller, H., Reiser, A. Parallelism and Recovery in Database Systems. *ACM Trans. on Database Systems* 5(2):139–156, June, 1980.
- [Bayer, McCreight 72] Bayer, R., McCreight, E. Organization and Maintenance of Large Ordered Indices. *Acta Informatica* 1(3):173–189, 1972.
- [Bayer, Schkolnick 77] Bayer, R., Schkolnick, M. Concurrency of Operations on B-trees. *Acta Informatica* 9:1–21, 1977.

- [Beeri et al. 83] Beeri, C., Bernstein, P.A., Goodman, N., Lai, M.Y., Shasha, D.E. A Concurrency Control Theory for Nested Transactions. In *Proc. 2nd ACM SIGACT-SIGOPS Symp. on Principles of Distributed Computing*, pages 45–62. Montreal, August, 1983.
- [Beeri, Obermarck 81] Beeri, C., Obermarck, R. A Resource Class Independent Deadlock Detection Algorithm. In *Proc. 7th Int'l Conf. on Very Large Databases*, pages 166–178. Cannes, France, September, 1981.
- [Belford, Schwartz, Sluizer 76] Belford, G.G., Schwartz, P.M., Sluizer, S. *The Effect of Back-up Strategy on Database Availability*. Technical Report CAC Document No. 181, CCTCWAD Document No. 5515, Center for Advanced Computation, University of Illinois at Urbana-Champaign, February, 1976.
- [Ben-Ari 82] Ben-Ari, M. *Principles of Concurrent Programming*. Prentice-Hall, Englewood Cliffs, N.J., 1982.
- [Bernstein et al. 78] Bernstein, P.A., Rothnie, J.B., Jr., Goodman, N., Papadimitriou, C.H. The Concurrency Control Mechanism of SDD-1: A System for Distributed Databases (The Fully Redundant Case). *IEEE Trans. on Software Engineering SE-4(3):154–168*, May, 1978.
- [Bernstein, Goodman 79] Bernstein, P.A., Goodman, N. Approaches to Concurrency Control in Distributed Databases. In *Proc. Nat'l Computer Conf.*, pages 813–821. AFIPS Press, Arlington, VA, June, 1979.
- [Bernstein, Goodman 81] Bernstein, P.A., Goodman, N. Concurrency Control in Distributed Database Systems. *ACM Computing Surveys* 13(2):185–221, June, 1981.
- [Bernstein, Goodman 82] Bernstein, P.A., Goodman, N. A Sophisticate's Introduction to Distributed Database Concurrency Control. In *Proc. 8th Int'l Conf. on Very Large Data Bases*, pages 62–76. Mexico City, September, 1982.
- [Bernstein, Goodman 83] Bernstein, P.A., Goodman, N. Multiversion Concurrency Control-Theory and Algorithms. *ACM Trans. on Database Systems* 8(4):465–483, December, 1983.
- [Bernstein, Goodman 84] Bernstein, P.A., Goodman, N. An Algorithm for Concurrency Control and Recovery in Replicated Distributed Databases. *ACM Trans. on Database Systems* 9(4):596–615, December, 1984.
- [Bernstein, Goodman 86a] Bernstein, P.A., Goodman, N. Serializability Theory for Replicated Databases. *Journal of Computer and System Sciences* 31(3):355–374, December, 1986.
- [Bernstein, Goodman 86b] Bernstein, P.A., Goodman, N. A Proof Technique for Concurrency Control and Recovery Algorithms for Replicated Databases. *Distributing Computing* 1, Springer-Verlag, 1986.
- [Bernstein, Goodman, Hadzilacos 83] Bernstein, P.A., Goodman, N., Hadzilacos, V. Recovery Algorithms for Database Systems. In *Proc. IFIP 9th World Computer Congress*, pages 799–807. North-Holland, Amsterdam, September, 1983.
- [Bernstein, Goodman, Lai 83] Bernstein, P.A., Goodman, N., Lai, M.Y. Analyzing Concurrency Control when User and System Operations Differ. *IEEE Trans. on Software Engineering* SE-9(3):233–239, May, 1983.
- [Bernstein, Shipman 80] Bernstein, P.A., Shipman, D. The Correctness of Concurrency Mechanisms in a System for Distributed Databases (SDD-1). *ACM Trans. on Database Systems* 5(1):52–68, March, 1980.

- [Bernstein, Shipman, Rothnie 80] Bernstein, P.A., Shipman, D.W., Rothnie, J.B., Jr. Concurrency Control in a System for Distributed Databases (SDD-1). *ACM Trans. on Database Systems* 5(1):18–51, March, 1980.
- [Bernstein, Shipman, Wong 79] Bernstein, P.A., Shipman, D.W., Wong, W.S. Formal Aspects of Serializability in Database Concurrency Control. *IEEE Trans. on Software Engineering* 5(3):203–216, May, 1979.
- [Bhargava 82] Bhargava, B. Performance Evaluation of the Optimistic Approach to Distributed Database Systems and Its Comparison to Locking. In *Proc. 3rd Int'l Conf. on Distributed Computer Systems*, pages 466–473. IEEE, October, 1982.
- [Birman 86] Birman, K.P. *ISIS: A System for Fault-Tolerant Distributed Computing*. Technical Report 86-744, Department of Computer Science, Cornell University, Ithaca, NY, April, 1986.
- [Birman et al. 84] Birman, K.P., Joseph, T.A., Rauchie, T., El-Abbadi, A. Implementing Fault-Tolerant Distributed Objects. In *Proc. 4th Symp. on Reliability in Distributed Software and Database Systems*, pages 124–133. IEEE, Silver Spring, MD, October, 1984.
- [Bjork 73] Bjork, L.A. Recovery Scenario for a DB/DC System. In *Proc. ACM National Conf.*, pages 142–146. ACM, 1973.
- [Bjork, Davies 72] Bjork, L.A., Davies, C.T. *The Semantics of the Preservation and Recovery of Integrity in a Data System*. Technical Report TR-02.540, IBM, December, 1972.
- [Blasgen et al. 79] Blasgen, M.W., Gray, J.N., Mitoma, M., Price, T. The Convoy Phenomenon. *ACM Operating Systems Review* 14(2):20–25, April, 1979.
- [Blaustein et al. 83] Blaustein, B.T., Garcia-Molina, H., Ries, D.R., Chilenskas, R.M., Kaufman, C.W. *Maintaining Replicated Databases Even in the Presence of Network Partitions*. EASCON, 1983.
- [Borr 81] Borr, A.J. Transaction Monitoring in Encompass: Reliable Distributed Transaction Processing. In *Proc. 7th Int'l Conf. on Very Large Databases*, pages 155–165. Cannes, France, September, 1981.
- [Breitwieser, Kersen 79] Breitwieser, H., Kersen, U. Transaction and Catalog Management of the Distributed File Management System DISCO. In *Proc. 5th Int'l Conf. on Very Large Data Bases*, pages 340–350. Rio de Janeiro, 1979.
- [Breitwieser, Leszak 82] Breitwieser, H., Leszak, M. A Distributed Transaction Processing Protocol Based on Majority Consensus. In *Proc. 1st ACM SIGACT-SIGOPS Symp. on Principles of Distributed Computing*, pages 224–237. Ottawa, August, 1982.
- [Briatico, Ciuffoletti, Simoncini 84] Briatico, D., Ciuffoletti, A., Simoncini, L. A Distributed Domino-Effect Free Recovery Algorithm. In *Proc. 4th Symp. on Reliability in Distributed Software and Database Systems*, pages 207–217. IEEE, Silver Spring, MD, October, 1984.
- [Brinch Hansen 73] Brinch Hansen, P. *Operating System Principles*. Prentice-Hall, Englewood Cliffs, NJ, 1973.
- [Buckley, Silberschatz 84] Buckley, G.N., Silberschatz, A. Concurrency Control in Graph Protocols by Using Edge Locks. In *Proc. 3rd ACM SIGACT-SIGMOD Symp. on Principles of Database Systems*, pages 45–50. Waterloo, Ontario, April, 1984.
- [Carey 83] Carey, M.J. Granularity Hierarchies in Concurrency Control. In *Proc. 2nd ACM SIGACT-SIGMOD Symp. on Principles of Database Systems*, pages 156–164. Atlanta, GA, March, 1983.

- [Carey, Stonebraker 84] Carey, M., Stonebraker, M. The Performance of Concurrency Control Algorithms for DBMSs. In *Proc. 10th Int'l Conf. on Very Large Data Bases*, pages 107–118. Singapore, August, 1984.
- [Casanova 81] Casanova, M.A. *Lecture Notes in Computer Science*. Volume 116: *The Concurrency Control Problem of Database Systems*, Springer-Verlag, Berlin, 1981.
- [Casanova, Bernstein 80] Casanova, M.A., Bernstein, P.A. General Purpose Schedulers for Database Systems. *Acta Informatica* 14:195–220, 1980.
- [Casanova, Moura, Tucherman 85] Casanova, M.A., Moura, A.V., Tucherman, L. On the Correctness of a Local Storage Subsystem (Extended Abstract). In *Proc. 4th ACM SIGACT-SIGMOD Symp. on Principles of Database Systems*, pages 123–133. Portland, Oregon, March, 1985.
- [Ceri, Owicki 82] Ceri, S., Owicki, S. On the Use of Optimistic Methods for Concurrency Control in Distributed Databases. In *Proc. 6th Berkeley Workshop on Distributed Data Management and Computer Networks*. ACM/IEEE, February, 1982.
- [Ceri, Pelagatti 84] Ceri, S., Pelagatti, G. *Distributed Databases—Principles and Systems*. McGraw-Hill, New York, 1984.
- [Chamberlin, Boyce, Traiger 74] Chamberlin, D.D., Boyce, R.F., Traiger, I.L. A Deadlock-free Scheme for Resource Allocation in a Database Environment. In *Info. Proc. 74*. North-Holland, Amsterdam, 1974.
- [Chan et al. 82] Chan, A., Fox, S., Lin, W.T.K., Nori, A., Ries, D.R. The Implementation of an Integrated Concurrency Control and Recovery Scheme. In *Proc. ACM SIGMOD Conf. on Management of Data*, pages 184–191. Orlando, FL, June, 1982.
- [Chan, Gray 85] Chan, A., Gray, R. Implementing Distributed Read-Only Transactions. *IEEE Trans. on Software Engineering* SE-11(2):205–212, February, 1985.
- [Chan, Skeen 86] Chan, A., Skeen, D. *The Reliability Subsystem of a Distributed Database Manager*. Technical Report CCA-85-02, Computer Corporation of America, 1986.
- [Chandy, Lamport 85] Chandy, K.M., Lamport, L. Distributed Snapshots: Determining Global States of Distributed Systems. *ACM Trans. on Computer Systems* 3(1):63–75, February, 1985.
- [Chandy, Misra 82] Chandy, K.M., Misra, J. A Distributed Algorithm for Detecting Resource Deadlocks in Distributed Systems. In *Proc. 1st ACM SIGACT-SIGOPS Symp. on the Principles of Distributed Computing*, pages 157–164. Ottawa, August, 1982.
- [Chandy, Misra, Haas 83] Chandy, K.M., Misra, J., Haas, L.M. Distributed Deadlock Detection. *ACM Trans. on Computer Systems* 1(2):144–156, May, 1983.
- [Cheng, Belford 80] Cheng, W.K., Belford, G.G. Update Synchronization in Distributed Databases. In *Proc. 6th Int'l Conf. on Very Large Data Bases*, pages 301–308. Montreal, October, 1980.
- [Cheng, Belford 82] Cheng, W.K., Belford, G.G. The Resiliency of Fully Replicated Distributed Databases. In *Proc. 6th Berkeley Workshop on Distributed Data Management and Computer Networks*, pages 23–44. ACM/IEEE, February, 1982.
- [Chesnais, Gelenbe, Mitrani 83] Chesnais, A., Gelenbe, E., Mitrani, I. On The Modelling of Parallel Access to Shared Data. *Comm. ACM* 26(3):196–202, March, 1983.

- [Cheung, Kameda 85] Cheung, D., Kameda, T. Site-Optimal Termination Protocols for a Distributed Database under Networking Partitioning. In *Proc. 4th ACM SIGACT-SIGOPS Symp. on Principles of Distributed Computing*, pages 111–121. Minaki, Ontario, August, 1985.
- [Chin, Ramarao 83] Chin, F., Ramarao, K.V.S. Optimal Termination Protocols for Network Partitioning. In *Proc. 2nd ACM SIGACT-SIGMOD Symp. on Principles of Database Systems*, pages 25–35. Atlanta, GA, March, 1983.
- [Chu, Ohlmacher 74] Chu, W.W., Ohlmacher, G. Avoiding Deadlock in Distributed Data Bases. In *Proc. ACM National Conf.*, pages 150–160. November, 1974.
- [Coffman, Elphick, Shoshani 71] Coffman, E.G., Jr., Elphick, M., Shoshani, A. System Deadlocks. *Computing Surveys* 3(2):67–78, June, 1971.
- [Coffman 81] Coffman, E.G., Gelenbe, E., Plateau, B. Optimization of the Number of Copies in a Distributed Database. *IEEE Trans. on Software Eng.* 7(1):78–84, January, 1981.
- [Comer 79] Comer, D. The Ubiquitous B-Tree. *ACM Computing Surveys* 11(2):121–139, June, 1979.
- [Cooper 82] Cooper, E.C. Analysis of Distributed Commit Protocols. In *Proc. ACM SIGMOD Conf. on Management of Data*, pages 175–183. Orlando, FL, June, 1982.
- [Croker, Maier 86] Croker, A., Maier, D. A Dynamic Tree-Locking Protocol. In *Proc. Int'l Conf. on Data Engineering*, pages 49–56. IEEE, Los Angeles, CA, February, 1986.
- [Crus 84] Crus, R.A. Data Recovery in IBM Database 2. *IBM Systems Journal* 23(2):178–188, 1984.
- [Dadam, Schlageter 80] Dadam, P., Schlageter, G. Recovery in Distributed Databases Based on Non-Synchronized Local Checkpoints. *Information Processing 80*, 1980. North-Holland, Amsterdam.
- [Daniels, Spector 83] Daniels, D., Spector, A.Z. An Algorithm for Replicated Directories. In *Proc. 2nd ACM SIGACT-SIGOPS Symp. on Principles of Distributed Computing*, pages 104–113. Montreal, August, 1983.
- [Date 85] Date, C.J. *An Introduction to Database Systems, Volume 1*. Addison-Wesley, Reading, MA, 1985. 4th Edition.
- [Davidson 84] Davidson, S.B. Optimism and Consistency in Partitioned Distributed Database Systems. *ACM Trans. on Database Systems* 9(3):456–481, September, 1984.
- [Davidson, Garcia-Molina, Skeen 85] Davidson, S.B., Garcia-Molina, H., Skeen, D. Consistency in Partitioned Networks. *ACM Computing Surveys* 17(3):341–370, September, 1985.
- [Davies 73] Davies, C.T. Recovery Semantics for a DB/DC System. In *Proc. ACM National Conf.*, pages 136–141. ACM, 1973.
- [Deppe, Fry 76] Deppe, M.E., Fry, J.P. Distributed Databases: A Summary of Research. *Computer Networks* 1(2), September, 1976.
- [Devor, Carlson 82] Devor, C., Carlson, C.R. Structural Locking Mechanisms and Their Effect on Database Management System Performance. *Information Systems* 7(4):345–358, 1982.
- [Dijkstra 71] Dijkstra, E.W. Hierarchical Ordering of Sequential Processes. *Acta Informatica* 1(2):115–138, 1971.

- [Dubourdieu 82] Dubourdieu, D.J. Implementation of Distributed Transactions. In *Proc. 6th Berkeley Workshop on Distributed Data Management and Computer Networks*, pages 81–94. ACM/IEEE, 1982.
- [Dwork, Skeen 83] Dwork, C., Skeen, D. The Inherent Cost of Nonblocking Commitment. In *Proc. 2nd ACM SIGACT-SIGOPS Symp. on Principles of Distributed Computing*, pages 1–11. Montreal, August, 1983.
- [Eager 81] Eager, D.L. *Robust Concurrency Control in Distributed Databases*. Technical Report CSRG #135, Computer Systems Research Group, University of Toronto, October, 1981.
- [Eager, Sevcik 83] Eager, D.L., Sevcik, K.C. Achieving Robustness in Distributed Database Systems. *ACM Trans. Database Syst.* 8(3):354–381, September, 1983.
- [Effelsberg, Haerder 84] Effelsberg, W., Haerder, T. Principles of Database Buffer Management. *ACM Trans. on Database Systems* 9(4):560–595, December, 1984.
- [El Abbadi, Skeen, Cristian 85] El Abbadi, A., Skeen, D., Cristian, F. An Efficient, Fault-Tolerant Protocol for Replicated Data Management. In *Proc. 4th ACM SIGACT-SIGMOD Symp. on Principles of Database Systems*, pages 215–228. Portland, Oregon, March, 1985.
- [El Abbadi, Toueg 86] El Abbadi, A., Toueg, S. Availability in Partitioned Replicated Databases. In *Proc. 5th ACM SIGACT-SIGMOD Symp. on Principles of Database Systems*, pages 240–251. Cambridge, MA, March, 1986.
- [Elhardt, Bayer 84] Elhardt, K., Bayer, R. A Database Cache for High Performance and Fast Restart in Database Systems. *ACM Trans. on Database Systems* 9(4):503–525, December, 1984.
- [Ellis 77] Ellis, C.A. A Robust Algorithm for Updating Duplicate Databases. In *Proc. 2nd Berkeley Workshop on Distributed Databases and Computer Networks*. ACM/IEEE, May, 1977.
- [Ellis 80] Ellis, C.S. Concurrent Search and Inserts in 2-3 Trees. *Acta Informatica* 14(1):63–86, 1980.
- [Ellis 83] Ellis, C.S. Extendible Hashing for Concurrent Operations and Distributed Data. In *Proc. 2nd ACM SIGACT-SIGMOD Symp. on Principles of Database Systems*, pages 106–116. Atlanta, GA, March, 1983.
- [Elmagarmid, Sheth, Liu 86] Elmagarmid, A.K., Sheth, A.P., Liu, M.T. Deadlock Detection Algorithm in Distributed Database Systems. In *Proc. Int'l Conf. on Data Engineering*, pages 556–564. IEEE, Los Angeles, February, 1986.
- [Eswaran et al. 76] Eswaran, K.P., Gray, J.N., Lorie, R.A., Traiger, I.L. The Notions of Consistency and Predicate Locks in a Database System. *Comm. ACM* 19(11):624–633, November, 1976.
- [Fischer 83] Fischer, M.J. *The Consensus Problem in Unreliable Distributed Systems (A Brief Survey)*. Technical Report YALEU/DCS/RR-273, Department of Computer Science, Yale University, June, 1983.
- [Fischer, Griffeth, Lynch 81] Fischer, M.J., Griffeth, N.D., Lynch, N.A. Global States of a Distributed System. In *Proc. 1st Symp. on Reliability in Distributed Software and Database Systems*, pages 31–38. IEEE, Pittsburgh, PA, 1981.
- [Fischer, Lynch 82] Fischer, M.J., Lynch, N.A. A Lower Bound for the Time to Assure Interactive Consistency. *Information Processing Letters* 14(4):183–186, June, 1982.
- [Fischer, Lynch, Paterson 83] Fischer, M.J., Lynch, N.A., Paterson, M.S. Impossibility of Distributed Consensus with One Faulty Process. In *Proc. 2nd ACM*

- SIGACT-SIGMOD Symp. on Principles of Database Systems*, pages 1–7. Atlanta, GA, March, 1983.
- [Fischer, Michael 82] Fischer, M.J., Michael, A. Sacrificing Serializability to Attain High Availability of Data in an Unreliable Network. In *Proc. 1st ACM SIGACT-SIGMOD Symp. on Principles of Database Systems*, pages 70–75. Los Angeles, March, 1982.
- [Ford, Calhoun 84] Ford, R., Calhoun, J. Concurrency Control Mechanisms and the Serializability of Concurrent Tree Algorithms. In *Proc. 3rd ACM SIGACT-SIGMOD Symp. on Principles of Database Systems*, pages 51–59. Waterloo, Ontario, April, 1984.
- [Ford, Schultz, Jipping 84] Ford, R., Schultz, R., Jipping, M. Performance Evaluation of Distributed Concurrency Control Mechanisms. In *Proc. 4th Symp. on Reliability in Distributed Software and Database Systems*, pages 84–89. IEEE, Silver Spring, MD, October, 1984.
- [Franašek, Robinson 85] Franašek, P., Robinson, J.T. Limitations of Concurrency in Transaction Processing. *ACM Trans. on Database Systems* 10(1):1–28, March, 1985.
- [Fussell, Kedem, Silberschatz 81a] Fussell, D.S., Kedem, Z.M., Silberschatz, A. A Theory of Correct Locking Protocols for Database Systems. In *Proc. 7th Int'l Conf. on Very Large Data Bases*, pages 112–124. Cannes, France, 1981.
- [Fussell, Kedem, Silberschatz 81b] Fussell, D.S., Kedem, Z.M., Silberschatz, A. Deadlock Removal Using Partial Rollback in Database Systems. In *Proc. ACM-SIGMOD Int'l Conf. on Management of Data*, pages 65–73. Ann Arbor, MI, April, 1981.
- [Gafni 85] Gafni, E. Improvements in the Time Complexity of Two Message-Optimal Election Algorithms. In *Proc. 4th ACM SIGACT-SIGOPS Symp. on Principles of Distributed Computing*, pages 175–185. Minaki, Ontario, August, 1985.
- [Galler 82] Galler, B.I. *Concurrency Control Performance Issues*. Technical Report CSRG-147, Computer Systems Research Group, University of Toronto, September, 1982.
- [Galler, Bos 83] Galler, B.I., Bos, L. A Model of Transaction Blocking in Databases. *Performance Evaluation* 3:95–122, 1983.
- [Garcia-Molina 78] Garcia-Molina, H. Performance Comparisons of Two Update Algorithms for Distributed Databases. In *Proc. 3rd Berkeley Workshop Distributed Databases and Computer Networks*, pages 108–118. ACM/IEEE, August, 1978.
- [Garcia-Molina 79a] Garcia-Molina, H. A Concurrency Control Mechanism for Distributed Databases which Use Centralized Locking Controllers. In *Proc. 4th Berkeley Workshop on Distributed Databases and Computer Networks*, pages 113–122. ACM/IEEE, August, 1979.
- [Garcia-Molina 79b] Garcia-Molina, H. *Performance of Update Algorithms for Replicated Data in a Distributed Database*. Tech. Rep. STAN-CS-79-744, Department of Computer Science, Stanford University, June, 1979.
- [Garcia-Molina 82] Garcia-Molina, H. Elections in a Distributed Computing System. *IEEE Trans. on Computers* C-31(1):48–59, January, 1982.
- [Garcia-Molina 83] Garcia-Molina, H. Using Semantic Knowledge for Transaction Processing in a Distributed Database. *ACM Trans. on Database Systems* 8(2):186–213, June, 1983.

- [Garcia-Molina 86] Garcia-Molina, H. The Future of Data Replication. In *5th Symp. on Reliability in Distributed Software and Data Base Systems*, pages 13–19. IEEE, Los Angeles, January, 1986.
- [Garcia-Molina et al. 83] Garcia-Molina, H., Allen, T., Blaustein, B., Chilenskas, R.M., Ries, D.R. Data-Patch: Integrating Inconsistent Copies of a Database after a Partition. In *Proc. 3rd IEEE Symp. on Reliability in Dist. Software and Database Systems*, pages 38–48. Clearwater Beach, FL, October, 1983.
- [Garcia-Molina, Barbara 83] Garcia-Molina, H., Barbara, D. *How to Assign Votes in a Distributed System*. Technical Report TR 311-3/1983, Department of Electrical Engineering and Computer Science, Princeton University, 1983.
- [Garcia-Molina, Kent, Chung 85] Garcia-Molina, H., Kent, J., Chung, J. An Experimental Evaluation of Crash Recovery Mechanisms. In *Proc. 4th ACM SIGACT-SIGMOD Symp. on Principles of Database Systems*, pages 113–122. Portland, Oregon, March, 1985.
- [Garcia-Molina, Pittelli, Davidson 86] Garcia-Molina, H., Pittelli, F., Davidson, S. Applications of Byzantine Agreement in Database Systems. *ACM Trans. on Database Systems* 11(1):27–47, March, 1986.
- [Garcia-Molina, Wiederhold 82] Garcia-Molina, H., Wiederhold, G. Read-Only Transactions in a Distributed Database. *ACM Trans. on Database Systems* 7(2):209–234, June, 1982.
- [Gardarin, Chu 79] Gardarin, G., Chu, W.W. A Reliable Distributed Control Algorithm for Updating Replicated Data. In *Proc. 6th Data Communication Symp.* IEEE, 1979.
- [Gardarin, Chu 80] Gardarin, G., Chu, W.W. A Distributed Control Algorithm for Reliably and Consistently Updating Replicated Databases. *IEEE Trans. on Computers* C-29(12):1060–1068, December, 1980.
- [Gardarin, Lebaux 79] Gardarin, G., Lebaux, P. Centralized Control Update Algorithms for Fully Redundant Distributed Databases. In *Proc. 1st Int'l Conf. on Distributed Computing Systems*, pages 699–705. IEEE, October, 1979.
- [Garey, Johnson 79] Garey, M.R., Johnson, D.S. *Computers and Intractability: A Guide to the Theory of NP-Completeness*. W.H. Freeman, San Francisco, 1979.
- [Gawlick, Kinkade 85] Gawlick, D., Kinkade, D. *Varieties of Concurrency Control in IMS/VS Fast Path*. Technical Report TR85.6, Tandem Computers, Cupertino, CA, 1985.
- [Gelenbe, Hebrail 86] Gelenbe, E., Hebrail, G. A Probability Model of Uncertainty in Data Bases. In *Proc. Int'l Conf. on Data Engineering*, pages 328–333. IEEE, Los Angeles, February, 1986.
- [Gelenbe, Sevcik 78] Gelenbe, E., Sevcik, K. Analysis of Update Synchronization for Multiple Copy Databases. In *Proc. 3rd Berkeley Workshop on Distributed Databases and Computer Networks*, pages 69–88. ACM/IEEE, August, 1978.
- [Gifford 79] Gifford, D.K. Weighted Voting for Replicated Data. In *Proc. 7th ACM SIGOPS Symp. on Operating Systems Principles*, pages 150–159. Pacific Grove, CA, December, 1979.
- [Gligor, Shattuck 80] Gligor, V.D., Shattuck, S.H. On Deadlock Detection in Distributed Systems. *IEEE Trans. on Software Engineering* 6(5):435–440, September, 1980.
- [Gold, Boral 86] Gold, I., Boral, H. The Power of the Private Workspace Model. *Information Systems* 11(1):1–9, 1986.

- [Goodman, Shasha 85] Goodman, N., Shasha, D. Semantically-based Concurrency Control for Search Structures. In *Proc. 4th ACM SIGACT-SIGMOD Symp. on Principles of Database Systems*. Portland, OR, March, 1985.
- [Goodman et al. 83] Goodman, N., Skeen, D., Chan, A., Dayal, U., Fox, S. Ries, D. A Recovery Algorithm for a Distributed Database System. In *Proc. 2nd ACM SIGACT-SIGMOD Symp. on Principles of Database Systems*, pages 8–15. Atlanta, GA, March, 1983.
- [Goodman, Suri, Tay 83] Goodman, N., Suri, R., Tay, Y.C. A Simple Analytic Model for Performance of Exclusive Locking in Database Systems. In *Proc. 2nd ACM SIGACT-SIGMOD Symp. on Principles of Database Systems*, pages 203–215. Atlanta, GA, March, 1983.
- [Graham, Griffeth 84] Graham, M.H., Griffeth, N. Reliable Scheduling of Database Transactions for Unreliable Systems. In *Proc. 3rd ACM SIGACT-SIGMOD Symp. on Principles of Database Systems*, pages 300–312. Waterloo, Ontario, April, 1984.
- [Gray 78] Gray, J.N. Notes on Database Operating Systems. *Operating Systems: An Advanced Course, Lecture Notes in Computer Science* 60:393–481, Springer-Verlag, Berlin, 1978.
- [Gray 80] Gray, J.N. A Transaction Model. *Lecture Notes in Computer Science* 85:282–298, Springer-Verlag, Berlin, 1980. G. Goos and J. Hartmanis (eds.).
- [Gray 81] Gray, J.N. The Transaction Concept: Virtues and Limitations. In *Proc. 7th Int'l Conf. on Very Large Data Bases*, pages 144–154. Cannes, France, September, 1981.
- [Gray 86] Gray, J.N. Why Do Computers Stop and What Can Be Done about It? In *5th Symp. on Reliability in Distributed Software and Data Base Systems*, pages 3–12. IEEE, Los Angeles, January, 1986.
- [Gray et al. 75] Gray, J.N., Lorie, R.A., Putzulo, G.R., Traiger, I.L. *Granularity of Locks and Degrees of Consistency in a Shared Database*. Research Report RJ1654, IBM , September, 1975.
- [Gray et al. 81a] Gray, J.N., McJones, P., Blasgen, M., Lindsay, B., Lorie, R., Price, T., Putzulo, F., Traiger, I. The Recovery Manager of the System R Database Manager. *ACM Computing Surveys* 13(2):223–242, June, 1981.
- [Gray et al. 81b] Gray, J., Homan, P., Korth, H., Obermarck, R. *A Straw Man Analysis of the Probability of Waiting and Deadlock in a Database System*. Technical Report RJ3066, IBM Research, San Jose, CA, February, 1981.
- [Gray, Lorie, Putzolu 75] Gray, J.N., Lorie, R.A., Putzolu, G.R. Granularity of Locks in a Shared Data Base. In *Proc. 1st Int'l Conf. on Very Large Data Bases*, pages 428–451. Framingham, MA, September, 1975.
- [Griffeth, Miller 84] Griffeth, N., Miller, J.A. Performance Modeling of Database Recovery Protocols. In *Proc. 4th Symp. on Reliability in Distributed Software and Database Systems*, pages 75–83. IEEE, Silver Spring, MD, October, 1984.
- [Hadzilacos, Papadimitriou 85] Hadzilacos, T., Papadimitriou, C.H. Algorithmic Aspects of Multiversion Concurrency Control. In *Proc. 4th ACM SIGACT-SIGMOD Symp. on Principles of Database Systems*, pages 96–104. Portland, OR, March, 1985.
- [Hadzilacos, Yannakakis 86] Hadzilacos, T., Yannakakis, M. Deleting Completed Transactions. In *Proc. 5th ACM SIGACT-SIGMOD Symp. on Principles of Database Systems*, pages 43–47. Cambridge, MA, March, 1986.

- [Hadzilacos 82] Hadzilacos, V. An Algorithm for Minimizing Roll Back Cost. In *Proc. 1st ACM SIGACT-SIGMOD Symp. on Principles of Database Systems*, pages 93–97. Los Angeles, March, 1982.
- [Hadzilacos 83] Hadzilacos, V. An Operational Model for Database System Reliability. In *Proc. 2nd ACM SIGACT-SIGMOD Symp. on Principles of Database Systems*, pages 244–256. Atlanta, GA, March, 1983.
- [Hadzilacos 86] Hadzilacos, V. A Theory of Reliability in Database Systems. 1986. Submitted for publication.
- [Haerder 84] Haerder, T. Observations on Optimistic Concurrency Control Schemes. *Information Systems* 9(2):111–120, October, 1984.
- [Haerder, Reuter 79] Haerder, T., Reuter, A. Optimization of Logging and Recovery in a Database System. *Database Architecture*:151–168, 1979. North Holland, Amsterdam, G. Bracchi and G.M. Nijssen (eds.).
- [Haerder, Reuter 83] Haerder, T., Reuter, A. Principles of Transaction-Oriented Database Recovery. *ACM Computing Surveys* 15(4):287–317, December, 1983.
- [Hammer, Shipman 80] Hammer, M., Shipman, D.W. Reliability Mechanisms for SDD-1: A System for Distributed Databases. *ACM Trans. on Database Systems* 5(4):431–466, December, 1980.
- [Herlihy 86] Herlihy, M. A Quorum-Consensus Replication Method for Abstract Data Types. *ACM Trans. on Computer Systems* 4(1):32–53, February, 1986.
- [Hewitt 74] Hewitt, C.E. *Protection and Synchronization in Actor Systems*. Working Paper No. 83, M.I.T. Intelligence Lab., Cambridge, MA, November, 1974.
- [Hoare 74] Hoare, C.A.R. Monitors: An Operating System Structuring Concept. *Comm. ACM* 17(10):549–557, October, 1974.
- [Holt 72] Holt, R.C. Some Deadlock Properties in Computer Systems. *ACM Computing Surveys* 4(3):179–196, September, 1972.
- [Holt 83] Holt, R.C. *Concurrent Euclid, the Unix System and Tunis*. Addison-Wesley, Reading, MA, 1983.
- [Holt et al. 78] Holt, R.C., Graham, G.S., Lazowska, E.D., Scott, M.A. *Structured Concurrent Programming with Operating Systems Applications*. Addison-Wesley, Reading, MA, 1978.
- [Horning et al. 74] Horning, J.J., Lauer, H.C., Melliar-Smith, P.M., Randell, B. A Program Structure for Error Detection and Recovery. *Lecture Notes in Computer Science* 16:171–187, E. Gelenbe and C. Kaiser (eds.). Springer-Verlag, Berlin, 1974.
- [Hua, Bhargava 82] Hua, C., Bhargava, B. Classes of Serializable Histories and Synchronization Algorithms In Distributed Database Systems. In *Proc. 3rd Int'l Conf. on Distributed Computer Systems*. Miami, FL, October, 1982.
- [Hunt, Rosenkrantz 79] Hunt, H.B., Rosenkrantz, D.J. The Complexity of Testing Predicate Locks. In *Proc. ACM-SIGMOD Int'l Conf. on Management of Data*, pages 127–133. Boston, MA, May, 1979.
- [Ibaraki, Kameda 83] Ibaraki, T., Kameda, T. *Multiversion vs. Single Version Serializability*. Technical Report 83-1, Laboratory for Computer and Communications Research, Simon Fraser University, 1983.
- [Irani, Lin 79] Irani, K.B., Lin, H.L. Queueing Network Models for Concurrent Transaction Processing in a Database System. In *Proc. ACM SIGMOD Int'l Conf. on Management of Data*, pages 134–142. Boston, MA, May, 1979.

- [Isloor, Marsland 80] Isloor, S.S., Marsland, T.A. The Deadlock Problem: An Overview. *Computer* 13(9):58–77, September, 1980.
- [Jefferson, Motro 86] Jefferson, D., Motro, A. The Time Warp Mechanism for Database Concurrency Control. In *Proc. Int'l Conf. on Data Engineering*, pages 474–481. IEEE, Los Angeles, CA, February, 1986.
- [Jordan, Banerjee, Batman 81] Jordan, J.R., Banerjee, J., Batman, R.B. Precision Locks. In *Proc. ACM-SIGMOD Int'l Conf. on Management of Data*, pages 143–147. Ann Arbor, MI, April, 1981.
- [Joseph, Birman 86] Joseph, T.A., Birman, K.P. Low Cost Management of Replicated Data in Fault-Tolerant Distributed Systems. *ACM Trans. on Computer Systems* 4(1):54–70, February, 1986.
- [Kaneko et al. 79] Kaneko, A., Nishihara, Y., Tsuruoka, K., Hattori, M. Logical Clock Synchronization Method for Duplicated Database Control. In *Proc. 1st Int'l Conf. Distributed Computing Systems*, pages 601–611. IEEE, October, 1979.
- [Kanellakis, Papadimitriou 81] Kanellakis, P., Papadimitriou, C.H. The Complexity of Distributed Concurrency Control. In *Proc. 22nd Conf. on Foundations of Computer Science*, pages 185–197. IEEE, New York, 1981.
- [Kanellakis, Papadimitriou 82] Kanellakis, P., Papadimitriou, C.H. Is Distributed Locking Harder? In *Proc. 1st ACM SIGACT-SIGMOD Symp. on Principles of Database Systems*, pages 98–107. Los Angeles, March, 1982.
- [Kawazu et al. 79] Kawazu, S., Minami, S., Itoh, S., Teranaka, K. Two-Phase Deadlock Detection Algorithm in Distributed Databases. In *Proc. 5th Int'l Conf. on Very Large Data Bases*, pages 360–367. Rio de Janeiro, 1979.
- [Kedem 83] Kedem, Z.M. Locking Protocols: From Exclusive to Shared Locks. *Journal of the ACM* 30(4):787–804, October, 1983.
- [Kedem, Silberschatz 81] Kedem, Z.M., Silberschatz, A. A Characterization of Database Graphs Admitting a Simple Locking Protocol. *Acta Informatica* 16:1–13, 1981.
- [Kersten, Tebra 84] Kersten, M., Tebra, H. Application of an Optimistic Concurrency Control Method. *Software Practice and Experience* 14, February, 1984.
- [Kiessling, Landherr 83] Kiessling, W., Landherr, G. A Quantitative Comparison of Lockprotocols for Centralized Databases. In *Proc. 9th Int'l Conf. on Very Large Data Bases*, pages 120–130. Florence, Italy, October, 1983.
- [Kim 79] Kim, K.H. Error Detection, Reconfiguration and Recovery in Distributed Processing Systems. In *Proc. 1st Int'l Conf. on Distributed Computing*, pages 284–294. IEEE, 1979.
- [King, Collmeyer 74] King, P.F., Collmeyer, A.J. Database Sharing—An Efficient Mechanism for Supporting Concurrent Processes. In *Proc. 1974 NCC*. AFIPS Press, Montvale, NJ, 1974.
- [Klahold et al. 85] Klahold, P., Schlageter, G., Unland, R., Wilkes, W. A Transaction Model Supporting Complex Applications in Integrated Information Systems. In *Proc. ACM-SIGMOD Int'l Conf. on Management of Data*, pages 388–401. Austin, TX, May, 1985.
- [Kohler 81] Kohler, W. A Survey of Techniques for Synchronization and Recovery in Decentralized Computer Systems. *ACM Computing Surveys* 13(2):149–184, June, 1981.

- [Koon, Ozsu 86] Koon, T., Ozsu, M. T. Performance Comparison of Resilient Concurrency Control Algorithms for Distributed Databases. In *Proc. Int'l Conf. on Data Engineering*, pages 565–573. IEEE, Los Angeles, February, 1986.
- [Korth 82] Korth, H.F. Deadlock Freedom Using Edge Locks. *ACM Trans. on Database Systems* 7(4):632–652, December, 1982.
- [Korth 83] Korth, H.F. Locking Primitives in a Database System. *Journal of the ACM* 30(1):55–79, January, 1983.
- [Korth et al. 83] Korth, H.F., Krishnamurthy, R., Nigam, A., Robinson, J.T. A Framework for Understanding Distributed (Deadlock Detection) Algorithms. In *Proc. 2nd ACM SIGACT-SIGMOD Symp. on Principles of Database Systems*, pages 192–201. Atlanta, GA, March, 1983.
- [Krishnamurthy, Dayal 82] Krishnamurthy, R., Dayal, U. Theory of Serializability for a Parallel Model Of Transactions. In *Proc. 1st ACM SIGACT-SIGMOD Symp. on Principles of Database Systems*, pages 293–305. Los Angeles, March, 1982.
- [Kung, Lehman 80] Kung, H.T., Lehman, P.L. Concurrent Manipulation of Binary Search Trees. *ACM Trans. on Database Systems* 5(3):339–353, 1980.
- [Kung, Papadimitriou 79] Kung, H.T., Papadimitriou, C.H. An Optimality Theory of Concurrency Control for Databases. In *Proc. ACM-SIGMOD Int'l Conf. Management of Data*, pages 116–125. May, 1979. Also, *Acta Informatica* 19(1):1–11, 1983.
- [Kung, Robinson 81] Kung, H.T., Robinson, J.T. On Optimistic Methods for Concurrency Control. *ACM Trans. on Database Systems* 6(2):213–226, June, 1981.
- [Kuss 82] Kuss, H. On Totally Ordering Checkpoints in Distributed Databases. In *Proc. ACM-SIGMOD Int'l Conf. on Management of Data Bases*. Orlando, FL, Page 174, June, 1982.
- [Kwong, Wood 82] Kwong, Y.S., Wood, D. Method for Concurrency in B-Trees. *IEEE Trans. on Software Engineering* SE-8(3):211–223, 1982.
- [Lai, Wilkinson 84] Lai, M.Y., Wilkinson, W.K. Distributed Transaction Management in JASMIN. In *Proc. 10th Int'l Conf. on Very Large Data Bases*, pages 466–472. Singapore, August, 1984.
- [Lakshman, Agrawala 86] Lakshman, T.V., Agrawala, A.K. $O(N\sqrt{N})$ Decentralized Commit Protocols. In *5th Symp. on Reliability in Distributed Software and Data Base Systems*, pages 104–112. IEEE, Los Angeles, January, 1986.
- [Lamport 78a] Lamport, L. The Implementation of Reliable Distributed Multi-process Systems. *Computer Networks* 1(2):95–114, 1978.
- [Lamport 78b] Lamport, L. Time, Clocks, and the Ordering of Events in a Distributed System. *Comm. ACM* 21(7):558–565, July, 1978.
- [Lampson 81] Lampson, B.W. Atomic Transactions. *Distributed Systems—Architecture and Implementation: An Advanced Course*. Springer-Verlag, Berlin, 1981, pages 246–265, Chapter 11. G. Goos and J. Hartmanis (eds.).
- [Lampson, Sturgis 76] Lampson, B., Sturgis, H. *Crash Recovery in a Distributed Data Storage System*. Technical Report, Computer Science Laboratory, Xerox, Palo Alto Research Center, Palo Alto, CA, 1976.
- [Langer, Shum 82] Langer, A.M., Shum, A.W. The Distribution of Granule Accesses Made by Database Transactions. *Comm. ACM* 25(11):831–832, November, 1982.

- [Lausen 81] Lausen, G. Serializability Problems of Interleaved Database Transactions. In *Proc. of 3rd Conf. European Cooperation in Informatics, Lecture Notes in Computer Science*, Vol. 123, pages 252–265. Springer-Verlag, Berlin, October, 1981.
- [Lausen 83] Lausen, G. Formal Aspects of Optimistic Concurrency Control in a Multiple Version Database System. *Information Systems* 8(4):291–300, February, 1983.
- [Lausen, Soisalon-Soininen, Widmayer 84] Lausen, G., Soisalon-Soininen, E., Widmayer, P. Maximal Concurrency by Locking. In *Proc. 3rd ACM SIGACT-SIGMOD Symp. on Principles of Database Systems*, pages 38–43. Waterloo, Ontario, April, 1984.
- [Lavnerberg 84] Lavnerberg, S.S. A Simple Analysis of Exclusive and Shared Lock Contention in a Database System. In *Proc. ACM SIGMETRICS Conf. on Measurement and Modeling of Computer Systems*. Boston, MA, August, 1984.
- [Lee 80] Lee, H. Queueing Analysis of Global Synchronization Schemes for Multi-copy Databases. *IEEE Trans. on Computers* 29(5), May, 1980.
- [Lehman, Yao 81] Lehman, P.L., Yao, S.B. Efficient Locking for Concurrent Operations on B-Trees. *ACM Trans. on Database Systems* 6(4):650–670, December, 1981.
- [LeLann 78] LeLann, G. Algorithms for Distributed Data-Sharing Systems Which Use Tickets. In *Proc. 3rd Berkeley Workshop Distributed Databases and Computer Networks*, pages 259–272. ACM/IEEE, August, 1978.
- [LeLann 81] LeLann, G. Error Recovery. *Distributed Systems—Architecture and Implementation: An Advanced Course*. Springer-Verlag, Berlin, 1981. B.W. Lampson, M. Paul, H.J. Siegert (eds.).
- [Leu, Bhargava 86] Leu, P., Bhargava, B. Multidimensional Timestamp Protocols for Concurrency Control. In *Proc. Int'l Conf. on Data Engineering*, pages 482–489. IEEE, Los Angeles, February, 1986.
- [Lien, Weinberger 78] Lien, Y.E., Weinberger, P.J. Consistency, Concurrency and Crash Recovery. In *Proc. ACM-SIGMOD Conf. on Management of Data*, pages 9–14. Austin, TX, 1978.
- [Lin 79] Lin, W.K. Concurrency Control in a Multiple Copy Distributed Data Base System. In *Proc. 4th Berkeley Workshop on Distributed Data Management and Computer Networks*, pages 207–219. ACM/IEEE, August, 1979.
- [Lin 81] Lin, W.K. Performance Evaluation of Two Concurrency Control Mechanisms in a Distributed Database System. In *Proc. ACM-SIGMOD Int'l Conf. on Management of Data*, pages 84–92. Ann Arbor, MI, April, 1981.
- [Lin et al. 82] Lin, W.K., et al. *Distributed Database Control and Allocation: Semi-Annual Report*. Technical Report, Computer Corporation of America, Cambridge, MA, January, 1982.
- [Lin, Nolte 82a] Lin, W.K., Nolte, J. Read Only Transactions and Two Phase Locking. In *Proc. 2nd Symp. on Reliability in Distributed Software and Database Systems*, pages 85–93. IEEE, Pittsburgh, PA, 1982.
- [Lin, Nolte 82b] Lin, W.K., Nolte, J. Performance of Two Phase Locking. In *Proc. 6th Berkeley Workshop on Distributed Data Management and Computer Networks*, pages 131–160. ACM/IEEE, February, 1982.
- [Lindsay 79] Lindsay, B.G. *Notes on Distributed Databases*. Research Report RJ2517, IBM San Jose, CA, July, 1979.

- [Lindsay 80] Lindsay, B.G. Single and Multi-Site Recovery Facilities. *Distributed Data Bases*. Cambridge University Press, Cambridge, U.K., 1980, pages 247–284, Chapter 10. Also available as IBM Research Report RJ2517, San Jose, CA, July 1979.
- [Lindsay et al. 84] Lindsay, B.G., Haas, L.M., Mohan, C., Wilms, P.F., Yost, R.A. Computation and Communication in R*: A Distributed Database Manager. *ACM Trans. on Computer Systems* 2(1):24–38, February, 1984.
- [Liskov 81] Liskov, B. On Linguistic Support for Distributed Programs. In *Proc. 1st Symp. on Reliability in Distributed Software and Database Systems*, pages 53–60. Pittsburgh, PA, July, 1981.
- [Liskov, Scheifler 83] Liskov, B., Scheifler, R. Guardians and Actions: Linguistic Support for Robust, Distributed Programs. *ACM Trans. on Programming Languages and Systems* 5(3):381–404, July, 1983.
- [Lomet 77a] Lomet, D.B. A Practical Deadlock Avoidance Algorithm for Data Base Systems. In *Proc. ACM SIGMOD Int'l Conf. on Management of Data*, pages 122–127. Toronto, 1977.
- [Lomet 77b] Lomet, D.B. Process Structuring, Synchronization and Recovery Using Atomic Actions. *ACM SIGPLAN Notices* 12(3):128–137, March, 1977.
- [Lomet 78] Lomet, D.B. Multi-Level Locking with Deadlock Avoidance. In *Proc. Annual Conf. of the ACM*, pages 862–867, 1978.
- [Lomet 79] Lomet, D.B. Coping with Deadlock in Distributed Systems. *Data Base Architecture*. Von Nostrand Reinhold, 1979, pages 95–105. G. Bracchi and G.M. Nijssen (eds.).
- [Lomet 80a] Lomet, D.B. Subsystems of Processes with Deadlock Avoidance. *IEEE Trans. on Software Eng.* 6(3):297–304, May, 1980.
- [Lomet 80b] Lomet, D.B. *The Ordering of Activities in Distributed Systems*. Technical Report RC8450, IBM T.J. Watson Research Center, September, 1980.
- [Lorie 77] Lorie, R.A. Physical Integrity in a Large Segmented Database. *ACM Trans. on Database Systems* 2(1):91–104, March, 1977.
- [Lynch 83a] Lynch, N.A. Concurrency Control for Resilient Nested Transactions. In *Proc. 2nd ACM SIGACT-SIGMOD Symp. on Principles of Database Systems*, pages 166–181. Atlanta, GA, March, 1983.
- [Lynch 83b] Lynch, N.A. Multilevel Atomicity—A New Correctness Criterion for Database Concurrency Control. *ACM Trans. on Database Systems* 8(4):484–502, December, 1983.
- [Lynch, Fischer 81] Lynch, N.A., Fischer, M.J. On Describing the Behavior and Implementation of Distributed Systems. *Theoretical Computer Science* 13(1):17–43, 1981.
- [Macri 76] Macri, P.M. Deadlock Detection and Resolution in a CODASYL Based Data Management System. In *Proc. ACM SIGMOD Int'l Conf. on Management of Data*, pages 45–49. Washington, D.C., June, 1976.
- [Malcolm, Vasudevan 84] Malcolm, M.A., Vasudevan, R. Coping with Network Partitions and Processor Failures in a Distributed System. In *Proc. 4th Symp. on Reliability in Distributed Software and Data Base Systems*, pages 36–42. IEEE, Silver Spring, MD, October, 1984.
- [Manber, Ladner 84] Manber, U., Ladner, R.E. Concurrency Control in a Dynamic Search Structure. *ACM Trans. on Database Systems* 9(3):439–455, September, 1984.

- [Marsland, Isloor 80] Marsland, T., Isloor, S.S. Detection of Deadlocks in Distributed Database Systems. *INFOR* 18(1):1-19, February, 1980.
- [McLean 81] McLean, G., Jr. Comments on SDD-1 Concurrency Control Mechanism. *ACM Trans. on Database Systems* 6(2):347-350, 1981.
- [Menasce, Landes 80] Menasce, D.A., Landes, O.E. On the Design of a Reliable Storage Component for Distributed Database Management Systems. In *Proc. 6th Int'l Conf. on Very Large Data Bases*, pages 365-375. Montreal, September, 1980.
- [Menasce, Muntz 79] Menasce, D.A., Muntz, R.R. Locking and Deadlock Detection in Distributed Databases. *IEEE Trans. Software Engineering* SE-5(3):195-202, May, 1979.
- [Menasce, Nakanishi 82a] Menasce, D.A., Nakanishi, T. Optimistic v. Pessimistic Concurrency Control Mechanism in Database Management Systems. *Information Systems* 7(1):13-28, 1982.
- [Menasce, Nakanishi 82b] Menasce, D.A., Nakanishi, T. Performance Evaluation of a Two-Phase Commit Based Protocol for DDBS. In *Proc. 1st ACM SIGACT-SIGMOD Symp. on Principles of Database Systems*, pages 247-255. Los Angeles, 1982.
- [Menasce, Popek, Muntz 80] Menasce, D.A., Popek, G.J., Muntz, R.R. A Locking Protocol for Resource Coordination in Distributed Databases. *ACM Trans. on Database Systems* 5(2):103-138, June, 1980.
- [Minoura 78] Minoura, T. Maximally Concurrent Transaction Processing. In *Proc. 3rd Berkeley Workshop on Distributed Databases and Computer Networks*, pages 206-213. ACM/IEEE, August, 1978.
- [Minoura 79] Minoura, T. A New Concurrency Control Algorithm for Distributed Data Base Systems. In *Proc. 4th Berkeley Workshop on Distributed Data Management and Computer Networks*, pages 221-233. ACM/IEEE, August, 1979.
- [Minoura 84] Minoura, T. Multi-level Concurrency of a Database System. In *Proc. 4th Symp. on Reliability in Distributed Software and Database Systems*, pages 156-168. IEEE, Silver Spring, MD, October, 1984.
- [Mitra 85] Mitra, D. Probabilistic Models and Asymptotic Results for Concurrent Processing with Exclusive and Non-exclusive Locks. *SIAM Journal of Computing* 14(4):1030-1051, November, 1985.
- [Mitra, Weinberger 84] Mitra, D., Weinberger, P.J. Probabilistic Models of Database Locking: Solutions, Computational Algorithms and Asymptotics. *Journal of the ACM* 31(4):855-878, October, 1984.
- [Mohan, Fussell, Silberschatz 82] Mohan, C., Fussell, D., Silberschatz, A. Compatibility and Commutativity in Non-Two-Phase Locking. In *Proc. ACM SIGACT-SIGMOD Symp. on Principles of Database Systems*, pages 283-292. Los Angeles, March, 1982.
- [Mohan, Lindsay 83] Mohan, C., Lindsay, B. *Efficient Commit Protocols for the Tree of Processes Model of Distributed Transactions*. Technical Report RJ3881, IBM Research, March, 1983.
- [Mohan, Strong, Finkelstein 83] Mohan, C., Strong, H.R., Finkelstein, S. Method for Distributed Transaction Commit and Recovery Using Byzantine Agreement within Clusters of Processors. In *Proc. 2nd ACM SIGACT-SIGOPS Symp. on Principles of Distributed Computing*. Montreal, August, 1983.
- [Montgomery 78] Montgomery, W.A. *Robust Concurrency Control for a Distributed Information System*. PhD thesis, Laboratory for Computer Science, M.I.T., Cambridge, MA, December, 1978.

- [Morris, Wong 84] Morris, R.J.T., Wong, W.S. Performance of Concurrency Control Algorithms with Nonexclusive Access. *Performance '84*:87–101, December, 1984.
- [Morris, Wong 85] Morris, R.J.T., Wong, W.S. Performance Analysis of Locking and Optimistic Concurrency Control Algorithms. *Performance Evaluation* 5(2):105–118, May, 1985.
- [Moss 85] Moss, J.E.B. *Nested Transactions: An Approach to Reliable Distributed Computing*. MIT Press, Cambridge, MA, 1985.
- [Moss, Griffith, Graham 86] Moss, J.E.B., Griffith, N., Graham, M. Abstraction in Recovery Management. In *Proc. ACM SIGMOD Int'l Conf. on Management of Data*. Washington, D.C., 1986.
- [Mueller, Moore, Popek 83] Mueller, E., Moore, J.E., Popek, G.J. A Nested Transaction Mechanism for LOCUS. In *Proc. 9th ACM SIGOPS Symp. on Operating System Principles*. Bretton Woods, NH, October, 1983. Also in *Oper. Syst. Review*, Vol.17 (5), Pages 71–89, 1983.
- [Munz, Krenz 77] Munz, R., Krenz, G. Concurrency in Database Systems—A Simulation Study. In *Proc. ACM SIGMOD Int'l Conf. on Management of Data*, pages 111–120. Toronto, August, 1977.
- [Obermarck 82] Obermarck, R. Deadlock Detection for All Resource Classes. *ACM Trans. on Database Systems* 7(2):187–208, June, 1982.
- [Ong 84] Ong, K.S. Synapse Approach to Database Recovery. In *Proc. 3rd ACM SIGACT-SIGMOD Symp. on Principles of Database Systems*, pages 79–85. Waterloo, Ontario, 1984.
- [Onuegbe, Du 86] Onuegbe, E.O., Du, H.C. A Locking Scheme for Associative Retrieval. In *Proc. Int'l Conf. on Data Engineering*, pages 574–579. IEEE, Los Angeles, February, 1986.
- [Page, Popek 85] Page, T.W., Jr., Popek, G.J. Distributed Data Management in Local Area Networks. In *Proc. 4th ACM SIGACT-SIGMOD Symp. on Principles of Database Systems*. Portland, OR, 1985.
- [Papadimitriou 79] Papadimitriou, C.H. Serializability of Concurrent Database Updates. *Journal of the ACM* 26(4):631–653, October, 1979.
- [Papadimitriou 81] Papadimitriou, C.H. On the Power of Locking. In *Proc. ACM-SIGMOD Int'l Conf. on Management of Data*, pages 148–154. Ann Arbor, MI, April, 1981.
- [Papadimitriou 86] Papadimitriou, C.H. *The Theory of Concurrency Control*. Computer Science Press, Rockville, MD, 1986.
- [Papadimitriou, Bernstein, Rothnie 77] Papadimitriou, C.H., Bernstein, P.A., Rothnie, J.B. Computational Problems Related to Database Concurrency Control. In *Proc. of Conf. on Theoretical Computer Science*, pages 275–282. Waterloo, Ontario, 1977.
- [Papadimitriou, Kanellakis 84] Papadimitriou, C.H., Kanellakis, P.C. On Concurrency Control by Multiple Versions. *ACM Trans. on Database Systems* 9(1):89–99, March, 1984.
- [Papadimitriou, Yannakakis 85] Papadimitriou, C.H., Yannakakis, M. The Complexity of Reliable Concurrency Control (Extended Abstract). In *Proc. 4th ACM SIGACT-SIGMOD Symp. on Principles of Database Systems*, pages 230–233. Portland, OR, March, 1985.

- [Parker et al. 83] Parker Jr., D.S., Popek, G.J., Rudisin, G., Stoughton, A., Walker, B.J., Walton, E., Chow, J.M., Edwards, D., Kiser, S., Kline, C. Detection of Mutual Inconsistency in Distributed Systems. *IEEE Trans. on Software Engineering* SE-9(3):240–247, May, 1983.
- [Parker, Ramas 82] Parker, D.S., Ramas, R.A. A Distributed File System Architecture Supporting High Availability. In *Proc. 8th Int'l Conf. on Very Large Data Bases*, pages 161–184. Mexico City, September, 1982.
- [Peinl, Reuter 83] Peinl, P., Reuter, A. Empirical Comparison of Database Concurrency Control Schemes. In *Proc. 9th Int'l Conf. on Very Large Data Bases*, pages 97–108. Florence, Italy, October, 1983.
- [Peterson, Strickland 83] Peterson, R.J., Strickland, J.P. Log Write-Ahead Protocols and IMS/VS Logging. In *Proc. 2nd ACM SIGACT-SIGMOD Symp. on Principles of Database Systems*, pages 216–242. Atlanta, GA, March, 1983.
- [Pittelli, Garcia-Molina 86] Pittelli, F., Garcia-Molina, H. Database Processing with Triple Modular Redundancy. In *Proc. 5th Symp. on Reliability in Distributed Software and Data Base Systems*, pages 95–103. IEEE, Los Angeles, January, 1986.
- [Popek et al. 81] Popek, G., Walker, B., Chow, J., Edwards, D., Kline, C., Rudisin, G., Thiel, G. Locus: A Network Transparent, High Reliability Distributed System. In *Proc. 8th ACM SIGOPS Symp. on Operating Systems Principles*, pages 169–177. December, 1981.
- [Potier, Leblanc 80] Potier, D., Leblanc, Ph. Analysis of Locking Policies in Database Management Systems. *Comm. ACM* 23(10):584–593, October, 1980.
- [Pradel, Schlageter, Unland 86] Pradel, U., Schlageter, G., Unland, R. Redesign of Optimistic Methods: Improving Performance and Applicability. In *Proc. Int'l Conf. on Data Engineering*, pages 466–473. IEEE, Los Angeles, February, 1986.
- [Pun, Belford 86] Pun, K.H., Belford, G.G. Optimal Granularity and Degree of Multiprogramming in a Distributed Database System. In *Proc. Int'l Conf. on Data Engineering*, pages 13–20. IEEE, Los Angeles, February, 1986.
- [Rahimi, Frants 79] Rahimi, S.K., Frants, W.R. A Posted Update Approach to Concurrency Control in Distributed Database Systems. In *Proc. 1st Int'l Conf. Distributed Computing Systems*, pages 632–641. IEEE, October, 1979.
- [Ramarao 85] Ramarao, K.V.S. On the Complexity of Commit Protocols. In *Proc. 4th ACM SIGACT-SIGMOD Symp. on Principles of Database Systems*, pages 235–244. Portland, OR, March, 1985.
- [Ramirez, Santoro 79] Ramirez, R.J., Santoro, N. Distributed Control of Updates in Multiple-Copy Data Bases: A Time Optimal Algorithm. In *Proc. 4th Berkeley Workshop on Distributed Data Management and Computer Networks*, pages 191–205. ACM/IEEE, August, 1979.
- [Rappaport 75] Rappaport, R.L. File Structure Design to Facilitate On-Line Instantaneous Updating. In *Proc. ACM SIGMOD Conf. on Management of Data*, pages 1–14. San Jose, CA, 1975.
- [Reed 78] Reed, D.P. *Naming and Synchronization in a Decentralized Computer System*. PhD thesis, M.I.T. Dept. of Electrical Engineering, 1978.
- [Reed 79] Reed, D.P. Implementing Atomic Actions. In *Proc. 7th ACM SIGOPS Symp. on Operating Systems Principles*. December, 1979.
- [Reed 83] Reed, D.P. Implementing Atomic Actions on Decentralized Data. *ACM Trans. on Computer Systems* 1(1):3–23, February, 1983.

- [Reuter 80] Reuter, A. A Fast Transaction-Oriented Logging Scheme for UNDO Recovery. *IEEE Trans. on Software Engineering* 6:348–356, July, 1980.
- [Reuter 82] Reuter, A. Concurrency on High-Traffic Data Elements. In *Proc. 1st ACM SIGACT-SIGMOD Symp. on Principles of Database Systems*, pages 83–92. Los Angeles, March, 1982.
- [Reuter 84] Reuter, A. Performance Analysis of Recovery. *ACM Trans. on Database Systems* 9(4):526–559, December, 1984.
- [Ries 79a] Ries, D.R. *The Effect of Concurrency Control on Database Management System Performance*. PhD thesis, Computer Science Dept., University of California, Berkeley, April, 1979.
- [Ries 79b] Ries, D.R. The Effects of Concurrency Control on the Performance of a Distributed Data Management System. In *Proc. 4th Berkeley Workshop on Distributed Data Management and Computer Networks*, pages 75–112. ACM/IEEE, August, 1979.
- [Ries, Stonebraker 77] Ries, D.R., Stonebraker, M. Effects of Locking Granularity in a Database Management System. *ACM Trans. on Database Systems* 2(3):233–246, September, 1977.
- [Ries, Stonebraker 79] Ries, D.R., Stonebraker, M. Locking Granularity Revisited. *ACM Trans. on Database Systems* 4(2):210–227, June, 1979.
- [Robinson 82] Robinson, J.T. *Design of Concurrency Controls for Transaction Processing Systems*. PhD thesis, Carnegie-Mellon University, 1982.
- [Roome 82] Roome, W.D. The Intelligent Store: A Content-Addressable Page Manager. *Bell System Technical Journal* 61(9, Part 2):2567–2596, November, 1982.
- [Rosen 79] Rosen, E.C. The Updating Protocol of the ARPANET’s New Routing Algorithm: A Case Study in Maintaining Identical Copies of a Changing Distributed Data Base. In *Proc. 4th Berkeley Workshop on Distributed Data Management and Computer Networks*, pages 260–274. ACM/IEEE, August, 1979.
- [Rosenkrantz, Stearns, Lewis 78] Rosenkrantz, D.J., Stearns, R.E., Lewis, P.M., II System Level Concurrency Control for Distributed Database Systems. *ACM Trans. on Database Systems* 3(2):178–198, June, 1978.
- [Rothnie et al. 80] Rothnie, J.B., Jr., Bernstein, P.A., Fox, S., Goodman, N., Hammer, M., Landers, T.A., Reeve, C., Shipman, D.W., Wong, E. Introduction to a System for Distributed Databases (SDD-1). *ACM Trans. on Database Systems* 5(1):1–17, March, 1980.
- [Rothnie, Goodman 77] Rothnie, J.B., Jr., Goodman, N. A Survey of Research and Development in Distributed Databases Systems. In *Proc. 3rd Int’l Conf. on Very Large Data Bases*, pages 48–59. Tokyo, October, 1977.
- [Ryu, Thomasian 86] Ryu, I.K., Thomasian, A. Analysis of Database Performance with Dynamic Locking. Manuscript in preparation, 1986.
- [Samadi 76] Samadi, B. B-Trees in a System with Multiple Users. *Inform. Proc. Letters* 5(4):107–112, 1976.
- [Schlageter 78] Schlageter, G. Process Synchronization in Database Systems. *ACM Trans. on Database Systems* 3(3):248–271, September, 1978.
- [Schlageter 79] Schlageter, G. Enhancement of Concurrency in DBS by the Use of Special Rollback Methods. *Database Architecture*. Von Nostrand Reinhold, 1979, pages 141–149. G. Bracchi and G.M. Nijssen (eds.).

- [Schlageter 81] Schlageter, G. Optimistic Methods for Concurrency Control in Distributed Database Systems. In *Proc. 7th Int'l Conf. on Very Large Databases*, pages 125–130. Cannes, France, September, 1981.
- [Schlageter, Dadam 80] Schlageter, G., Dadam, P. Reconstruction of Consistent Global States in Distributed Databases. In *Proc. Int'l Symp. on Distributed Databases*, pages 191–200. North-Holland, Amsterdam, 1980.
- [Schwarz, Spector 84] Schwarz, P.M., Spector, A.Z. Synchronizing Shared Abstract Types. *ACM Trans. on Computer Systems* 2(3):223–250, August, 1984.
- [Sequin, Sargeant, Wilnes 79] Sequin, J., Sargeant, G., Wilnes, P. A Majority Consensus Algorithm for the Consistency of Duplicated and Distributed Information. In *Proc. 1st Int'l Conf. on Distributed Computing Systems*, pages 617–624. IEEE, October, 1979.
- [Sevcik 83] Sevcik, K.C. Comparison of Concurrency Control Methods Using Analytic Models. *Information Processing* 83:847–858, 1983. R.E.A. Mason (ed.).
- [Shapiro, Millstein 77a] Shapiro, R.M., Millstein, R.E. NSW Reliability Plan. Technical Report 7701–1411, Computer Associates, Wakefield, MA., June, 1977.
- [Shapiro, Millstein 77b] Shapiro, R.M., Millstein, R.E. Reliability and Fault Recovery in Distributed Processing. In *Oceans '77 Conf. Record*. Vol. II, Los Angeles, 1977.
- [Shrivastava 85] Shrivastava, S.K. *Reliable Computer Systems*. Springer-Verlag, Berlin, 1985.
- [Shum 81] Shum, A.W., Spirakis, P.G. Performance Analysis of Concurrency Control Methods in Database Systems. *Performance '81*:1–19, 1981. F.J. Kylstra (ed.).
- [Siewiorek, Swarz 82] Siewiorek, D.P., Swarz, R.S. *The Theory and Practice of Reliable System Design*. Digital Press, Bedford, MA, 1982.
- [Silberschatz 82] Silberschatz, A. A Multi-version Concurrency Control Scheme with No Rollbacks. In *Proc. 1st ACM SIGACT-SIGOPS Symp. on Principles of Distributed Computing*, pages 216–233. Ottawa, August, 1982.
- [Silberschatz, Kedem 80] Silberschatz, A., Kedem, Z. Consistency in Hierarchical Database Systems. *Journal of the ACM* 27(1):72–80, January, 1980.
- [Sinha, Nandikar, Mehndiratta 85] Sinha, M. K., Nandikar, P. D., Mehndiratta, S. L. Timestamp Based Certification Schemes for Transactions in Distributed Databases. In *Proc. ACM-SIGMOD Int'l Conf. on Management of Data*, pages 402–413. Austin, TX, May, 1985.
- [Skeen 81] Skeen, D. A Decentralized Termination Protocol. In *Proc. 1st IEEE Symp. on Reliability in Distributed Software and Database Systems*, pages 27–32. IEEE, Pittsburgh, PA, July, 1981.
- [Skeen 82a] Skeen, D. Nonblocking Commit Protocols. In *Proc. ACM SIGMOD Conf. on Management of Data*, pages 133–147. Orlando, FL, June, 1982.
- [Skeen 82b] Skeen, D. A Quorum Based Commit Protocol. In *Proc. 6th Berkeley Workshop on Distributed Data Management and Computer Networks*, pages 69–80. ACM/IEEE, February, 1982.
- [Skeen 82c] Skeen, D. *Crash Recovery in a Distributed Database System*. Technical Report, Memorandum No. UCB/ERL M82/45, Electronics Research Laboratory, University of California at Berkeley, 1982.
- [Skeen 85] Skeen, D. Determining the Last Process to Fail. *ACM Trans. on Computer Systems* 3(1):15–30, February, 1985.

- [Skeen, Stonebraker 81] Skeen, D., Stonebraker, M. A Formal Model of Crash Recovery in a Distributed System. In *Proc. 5th Berkeley Workshop on Distributed Data Management and Computer Networks*, pages 129–142. ACM/IEEE, 1981.
- [Skeen, Wright 84] Skeen, D., Wright, D. Increasing Availability in Partitioned Database Systems. In *Proc. 3rd ACM SIGACT-SIGMOD Symp. on Principles of Database Systems*, pages 290–296. Waterloo, Ontario, April, 1984.
- [Socket, Krishnamurthy 84] Socket, G.H., Krishnamurthy, R. *Concurrency Control in Office-by-Example (OBE)*. Research Report RC 10545, IBM Research, May, 1984.
- [Soisalon-Soininen, Wood 82] Soisalon-Soininen, E., Wood, D. An Optimal Algorithm for Testing Safety and Detecting Deadlocks in Locked Transaction Systems. In *Proc. 1st ACM SIGACT-SIGMOD Symp. on Principles of Database Systems*, pages 108–116. Los Angeles, March, 1982.
- [Spector et al. 84] Spector, A.Z., Butcher, J., Daniels, D.S., Duchamp, D.J., Eppinger, J.L., Fineman, C.E., Heddya, A., Schwartz, P.M. Support for Distributed Transactions in the TABS Prototype. In *Proc. 4th Symp. on Reliability in Distributed Software and Database Systems*, pages 186–206. IEEE, Silver Spring, MD, October, 1984.
- [Spector, Schwarz 83] Spector, A.Z., Schwarz, P.M. Transactions: A Construct for Reliable Distributed Computing. *ACM Operating Systems Review* 14(2):18–35, April, 1983.
- [Stearns, Lewis, Rosenkrantz 76] Stearns, R.E., Lewis, P.M., II, Rosenkrantz, D.J. Concurrency Controls for Database Systems. In *Proc. 17th Symp. on Foundations of Computer Science*, pages 19–32. IEEE, 1976.
- [Stearns, Rosenkrantz 81] Stearns, R.E., Rosenkrantz, D.J. Distributed Database Concurrency Controls Using Before-Values. In *Proc. ACM-SIGMOD Conf. on Management of Data*, pages 74–83. 1981.
- [Stonebraker 79] Stonebraker, M. Concurrency Control and Consistency of Multiple Copies of Data in Distributed INGRES. *IEEE Trans. on Software Engineering* 3(3):188–194, May, 1979.
- [Stonebraker 81] Stonebraker, M. Operating System Support for Data Management. *Comm. ACM* 24(7):412–418, July, 1981.
- [Stonebraker, Neuhold 77] Stonebraker, M., Neuhold, E. A Distributed Database Version of INGRES. In *Proc. 2nd Berkeley Workshop on Distributed Data Management and Computer Networks*. ACM/IEEE, May, 1977.
- [Strom 81] Strom, B.I. Consistency of Redundant Databases in a Weakly Coupled Distributed Computer System. In *Proc. 5th Berkeley Workshop on Distributed Data Management and Computer Networks*, pages 143–153. ACM/IEEE, 1981.
- [Su 86] Su, J. Safety of Non-well-locked Transaction Systems. In *Proc. 5th ACM SIGACT-SIGMOD Symp. on Principles of Database Systems*, pages 47–52. Cambridge, MA, March, 1986.
- [Sugihara et al. 84] Sugihara, K., Kikuno, T., Yoshida, N., Ogata, M. A Distributed Algorithm for Deadlock Detection and Resolution. In *Proc. 4th Symp. on Reliability in Distributed Software and Database Systems*, pages 169–176. IEEE, Silver Spring, MD, October, 1984.
- [Tanenbaum 81] Tanenbaum, A.S. *Computer Networks*. Prentice-Hall, Englewood Cliffs, NJ, 1981.

- [Tay, Goodman, Suri 84] Tay, Y.C., Goodman, N., Suri, R. *Performance Evaluation of Locking in Databases: A Survey*. Technical Report 17-84, Aiken Computation Laboratory, Harvard University, October, 1984.
- [Tay, Goodman, Suri 85] Tay, Y.C., Goodman, N., Suri, R. Locking Performance in Centralized Databases. *ACM Trans. on Database Systems* 10(4):415-462, December, 1985.
- [Tay, Suri, Goodman 84] Tay, Y.C., Suri, R., Goodman, N. A Mean Value Performance Model for Locking in Databases: The Waiting Case. In *Proc. 3rd ACM SIGACT-SIGMOD Symp. on Principles of Database Systems*, pages 311-322. Waterloo, Ontario, April, 1984.
- [Tay, Suri, Goodman 85] Tay, Y.C., Suri, R., Goodman, N. A Mean Value Performance Model for Locking in Databases: The No Waiting Case. *Journal of the ACM* 32(3):618-651, July, 1985.
- [Thanos, Carles, Bertino 81] Thanos, C., Carles, C., Bertino, E. Performance Evaluation of Two Concurrency Control Mechanisms in a Distributed Database System. *Lecture Notes in Computer Science*. Springer-Verlag, Berlin, 1981, pages 266-279. G. Goos and J. Hartmanis (eds.).
- [Thomas 79] Thomas, R.H. A Majority Consensus Approach to Concurrency Control for Multiple Copy Databases. *ACM Trans. on Database Systems* 4(2):180-209, June, 1979.
- [Thomasian 82] Thomasian, A. An Iterative Solution to the Queueing Network Model of a DBMS with Dynamic Locking. In *Proc. 13th Computer Measurement Group Conf.*, pages 252-261. Computer Measurement Group, San Diego, CA, December, 1982.
- [Thomasian, Ryu 83] Thomasian, A., Ryu, I.K. A Decomposition Solution to the Queueing Network Model of the Centralized DBMS with Static Locking. In *Proc. ACM SIGMETRICS Conf. on Measurement and Modelling of Computer Systems*, pages 82-92. Minneapolis, August, 1983.
- [Tirri 83] Tirri, H. Freedom from Deadlock of Locked Transactions in a Distributed Database. In *Proc. 2nd ACM SIGACT-SIGOPS Symp. on Principles of Distributed Computing*, pages 267-276. Montreal, 1983.
- [Traiger 82] Traiger, I.L. Virtual Memory Management for Data Base Systems. *Operating Systems Review* 16(4):26-48, October, 1982.
- [Traiger et al. 82] Traiger, I.L., Gray, J., Galtier, C.A., Lindsay, B.G. Transactions and Consistency in Distributed Database Systems. *ACM Trans. on Database Systems* 7(3):323-342, September, 1982.
- [Ullman 82] Ullman, J.D. *Principles of Database Systems*. Computer Science Press, Rockville, MD, 1982. 2nd Edition.
- [Unland, Praedel, Schlageter 83] Unland, R., Praedel, U., Schlageter, G. Design Alternatives for Optimistic Concurrency Control Schemes. In *Proc. 2nd Int'l Conf. on Databases*, pages 288-297. Wiley, New York, September, 1983.
- [Verhofstad 77] Verhofstad, J.S.M. Recovery and Crash Resistance in a Filing System. In *Proc. ACM-SIGMOD Int'l Conf. Management of Data*, pages 158-167. Toronto, 1977.
- [Verhofstad 78] Verhofstad, J.S.M. Recovery Techniques for Database Systems. *ACM Computing Surveys* 10(2):167-196, 1978.
- [Verhofstad 79] Verhofstad, J.S.M. Recovery Based on Types. *Data Base Architecture*: 125-139, 1979. North-Holland, Amsterdam, G. Bracchi and G.M. Nijssen (eds.).

- [Walter 82] Walter, B. A Robust and Efficient Protocol for Checking the Availability of Remote Sites. In *Proc. 6th Berkeley Workshop on Distributed Data Management and Computer Networks*, pages 45–68. ACM/IEEE, February, 1982.
- [Weihl 83] Weihl, W.E. Data-Dependent Concurrency Control and Recovery. In *Proc. 2nd ACM SIGACT-SIGOPS Symp. on Principles of Distributed Computing*, pages 63–75. Montreal, August, 1983.
- [Weihl 85] Weihl, W. E. Distributed Version Management for Read-Only Actions. In *Proc. 4th ACM SIGACT-SIGOPS Symp. on Principles of Distributed Computing*, pages 122–135. Minaki, Ontario, August, 1985.
- [Weikum 86] Weikum, G. A Theoretical Foundation of Multi-Level Concurrency Control. In *Proc. 5th ACM SIGACT-SIGMOD Symp. on Principles of Database Systems*, pages 31–42. Cambridge, MA, March, 1986.
- [Weinberger 82] Weinberger, P.J. Making UNIX Operating Systems Safe for Databases. *Bell System Technical Journal* 61(9):2407–2422, November, 1982.
- [Wilkinson, Lai 84] Wilkinson, W.K., Lai, M.Y. Managing Replicated Data in JASMIN. In *Proc. 4th Symp. on Reliability in Distributed Software and Database Systems*, pages 54–60. IEEE, Silver Spring, MD, October, 1984.
- [Wolfson, Yannakakis 85] Wolfson, O., Yannakakis, M. Deadlock-Freedom (and Safety) of Transactions in a Distributed Database. In *Proc. 4th ACM SIGACT-SIGMOD Symp. on Principles of Database Systems*, pages 105–112. Portland, OR, March, 1985.
- [Wong, Edelberg 77] Wong, K.C., Edelberg, M. Interval Hierarchies and Their Application to Predicate Files. *ACM Trans. on Database Systems* 2(3):223–232, September, 1977.
- [Xu 82] Xu, J. A Formal Model for Maximum Concurrency in Transaction Systems with Predeclared Writesets. In *Proc. 8th Int'l Conf. on Very Large Data Bases*, pages 77–90. Mexico City, 1982.
- [Yannakakis 81] Yannakakis, M. Issues of Correctness in Database Concurrency Control by Locking. In *Proc. 13th ACM SIGACT Symp. on Theory of Computing*, pages 363–367. Milwaukee, 1981.
- [Yannakakis 82a] Yannakakis, M. Freedom from Deadlock of Safe Locking Policies. *SIAM J. Comput.* 11(2):391–407, May, 1982.
- [Yannakakis 82b] Yannakakis, M. A Theory of Safe Locking Policies in Database Systems. *Journal of the ACM* 29(3):718–740, July, 1982.
- [Yannakakis 84] Yannakakis, M. Serializability by Locking. *Journal of the ACM* 31(2):227–244, 1984.
- [Yannakakis, Papadimitriou, Kung 79] Yannakakis, M., Papadimitriou, C.H., Kung, H.T. Locking Policies: Safety and Freedom from Deadlock. In *Proc. 29th IEEE Symp. on Foundations of Computer Science*, pages 286–297, 1979.
- [Zhou, Yeh, Ng 84] Zhou, B., Yeh, R.T., Ng, P.A.B. An Algebraic System for Deadlock. In *Proc. 4th Symp. on Reliability in Distributed Software and Database Systems*, pages 177–185. IEEE, Silver Spring, MD, October, 1984.
- [Zobel 83] Zobel, D.D. The Deadlock Problem: A Classifying Bibliography. *ACM SIGOPS Operating Systems Review* 17(2):6–15, October, 1983.