



Curriculum Vitae – Leif Larsen

Executive Summary

Recognized as an authority in the field of transient analysis, Leif holds both BA and PhD degrees in Mathematics from the University of California, Irvine. With membership of the Mathematical Society and an Associate and Distinguished Lecturer of the SPE, Leif is also Adjunct Professor in the Department of Petroleum Technology at the University in Stavanger, Norway. Until joining KAPPA, Leif was the Well Test Specialist for Statoil in Stavanger.

Although a highly published author, a listing of which is available as an appendix to this CV, Leif is a practical and experienced engineer in his field. He is at home with the theory, practice and education of transient analysis.

Employment history

2008 – present

KAPPA

Senior Reservoir Engineer providing technical support in model design to the development department, providing training and consulting services to KAPPA clients in pressure transient analysis.

2002 - 2007

Statoil

Specialist Well Testing, Production Technology. Central advisor for transient analysis; handling field-referred complex cases. Working as a mentor for more junior engineers; training in the methodology and practical application of transient analysis. Teaching and running workshops for the most advanced engineers in transient analysis within Statoil.

1991 - 2002

Statoil

Staff Engineer, Production Technology

1985 - 1991

Rogaland Research Institute

Research Supervisor, Petroleum Technology

1985 - 1988

Statoil

Consultant in the Section for Special Studies, Reservoir Technology.



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1980 - 1985	Rogaland Research Researcher, Sector for Petroleum Technology.
1979 - 1980	Rogaland College Center Amanuensis in Mathematics.
1977 - 1979	Agder Regional College Amanuensis in Mathematics.
1975 - 1976	University of Oslo Assistant, Mathematics Department
1973 - 1975	University of California, Irvine Assistant, Mathematics Department
1972 - 1973	University of California, Irvine Research Assistant, Mathematics Department
1969 - 1972	University of California, Irvine Teaching Assistant, Mathematics Department.

Professional affiliations

- SPE, Associate member, Distinguished Lecturer, Technical Advisor and Editor, Member of the Pressure Transient Analysis Technical Committee.

Honors

- Recipient of the 2012 SPE Formation Evaluation Award.

Publications

See Appendix



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APPENDIX A

Publications in Mathematics:

1. Larsen, Leif: "Hierarchies of Computational Groups and the Conjugacy Problem," Ph.D. thesis, University of California, Irvine, 1975.
2. Larsen, Leif: "The Solvability of the Conjugacy Problem for Certain Free Groups With Amalgamation," *J. Algebra*, (1976), 28-41.
3. Larsen, Leif: "The Conjugacy Problem and Cyclic HNN Constructions," *J. Austral. Math. Soc.* Vol. 23 No. 4 (1977), 385-401.
4. Larsen, Leif: "On the Computability of Conjugate Powers in Finitely Generated Fuchsian Groups," *Acta Mathematica*, 139 (1977), 267-291.
5. Larsen, Leif: "Decision Problems and Minimal Identities in Groups," preprint, Agder Regional College, 1979.

Publications in Petroleum Technology:

1. Larsen, Leif: "Wells Producing Commingled Zones With Unequal Initial Pressure and Reservoir Properties," paper SPE 10325 presented at the 1981 SPE Annual Technical Conference and Exhibition, San Antonio, Oct. 5-7 (Accepted for publication in *Soc. Pet. Eng. J.*)
2. Larsen, Leif: "Determination of Skin Factors and Flow Capacities of Individual Layers in Two-Layered Reservoirs," paper SPE 11138 presented at the 1982 SPE Annual Technical Conference and Exhibition, New Orleans, Sept. 26-29.
3. Larsen, Leif: "Limitations on the Use of Single- and Multiple-Rate Horner, Miller- Dyes-Hutchinson, and Matthews-Brons-Hazebroek Analysis," paper SPE 12135 presented at the 1983 SPE Annual Technical Conference and Exhibition, San Fransisco, Oct. 5-8. (Accepted for publication in *Soc. Pet. Eng. J.*)
4. Larsen, Leif: "Wellbore Pressure Near Closed Boundaries," unsolicited paper SPE 11861 (Accepted for publication in *Soc. Pet. Eng. J.*)
5. Haugland, T., Larsen, L., and Skjæveland, S.M.: "Analyzing Pressure Buildup Data by the Rectangular Hyperbola Approach," paper SPE 13079 presented at the 1984 SPE Annual Technical Conference and Exhibition, Houston, Sept. 16-19. (Accepted for publication in *SPEFE*)



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6. Larsen, Leif: "Wellbore Pressures in Reservoirs With Constant-Pressure or Mixed No-Flow/Constant-Pressure Outer Boundary," *JPT* (Sept. 1984) 1613-1616.
7. Larsen, Leif: "A Simple Approach to Pressure Distributions in Geometric Shapes," *Soc. Pet. Eng. J.* (Feb. 1985) 113-120.
8. Littlehamar, Terje and Larsen, Leif: "Matching Simulator Well-Block Pressures With Observed Buildup Pressures in Two-Layer Reservoirs," *SPE* (March 1986) 183-193.
9. Larsen, Leif: "Cumulative Influx Across Constant-Pressure Boundaries of Rectangular Reservoirs and Its Effect of Well-Test Analysis," *North Sea Oil and Gas Reservoirs: An International Seminar*, Kleppe, J., et al., eds., Graham & Trotman Ltd., London. 1987.
10. Larsen, Leif and Hovdan, Michael: "Analyzing Well-Test Data From Linear Reservoirs by Conventional Methods," paper SPE 16777 presented at the 1987 SPE Annual Technical Conference and Exhibition, Dallas, Sept. 27-30. (Accepted for publication in *SPE*.)
11. Larsen, Leif: "Similarities and Differences in Methods Currently Used to Analyze Pressure-Transient Data From Layered Reservoirs," paper SPE 18122 presented at the 1988 SPE Annual Technical Conference and Exhibition, Houston, Oct. 5-7.
12. Larsen, Leif: "Boundary Effects in Pressure-Transient Data From Layered Reservoirs," paper SPE 19797 presented at the 1989 SPE Annual Technical Conference and Exhibition, San Antonio, Oct. 8-11. (Accepted for publication in *SPE*.)
13. Larsen, L. and Bratvold, R.B.: "Effects of Linear Boundaries on Pressure-Transient Injection and Falloff Data," paper SPE 19830 presented at the 1989 SPE Annual Technical Conference and Exhibition, San Antonio, Oct. 8-11.
14. Larsen, Leif and Kviljo, Knut: "Variable Skin and Cleanup Effects in Well-Test Data," *SPE* (Sept. 1990) 272-276.
15. Larsen, L., Kviljo, K., and Littlehamar, T.: "Estimating Skin Decline and Relative Permeabilities From Cleanup Effects in Well-Test Data Using Buckley-Leverett Methods," *SPE* (Dec. 1990) 360-368.
16. Larsen, L. and Hegre, T.M.: "Pressure-Transient Behavior of Horizontal Wells With Finite-Conductivity Fractures," paper SPE 22076 presented at the 1991 International Arctic Technology Conference, Anchorage, May 29-31.
17. Larsen, Leif: "Pressure-Transient Behavior of Reservoirs Forming a Pattern of Coupled Linear Segments," paper SPE 26459 presented at the 1993 SPE Annual Technical Conference and Exhibition, Houston, Oct. 3-6.



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18. Larsen, Leif: "The Pressure-Transient Behavior of Vertical Wells With Multiple Flow Entries," paper SPE 26480 presented at the 1993 SPE Annual Technical Conference and Exhibition, Houston, Oct. 3-6.
19. Larsen, L. and Bratvold, R.B.: "Effects of Propagating Fractures on Pressure- Transient Injection and Falloff Data," *SPEFE* (June 1994) 105-114.
20. Larsen, Leif: "Experiences With Combined Analyses of PLT and Pressure-Transient Data From Layered Reservoirs," paper SPE 27973 presented at the 1994 Tulsa Centennial Petroleum Engineering Symposium, Tulsa, Aug. 29-31.
21. Larsen, L. and Hegre, T.M.: "Pressure Transient Analysis of Multifractured Horizontal Wells," paper SPE 28389 presented at the 1994 SPE Annual Technical Conference and Exhibition, New Orleans, Sept. 25-28.
22. Hegre, T.M. and Larsen, L.: "Productivity of Multifractured Horizontal Wells," paper SPE 28845 presented at the 1994 European Petroleum Conference, London, Oct. 25-27.
23. Unneland, Trond and Larsen, Leif: "Limitations of the Skin Concept and Its Impact on Success Criteria Used in Sand Control," paper SPE 30093 presented at the 1995 European Formation Damage Conference, The Hague, May 15-16.
24. Larsen, Leif: "Pressure-Transient Behavior of Wells Producing From a Complex Pattern of Interconnected Linear Segments," paper SPE 36549 presented at the 1996 SPE Annual Technical Conference and Exhibition, Denver, Oct. 6-9.
25. Larsen, Leif: "Productivity Computations for Multilateral, Branched and Other Generalized and Extended Well Concepts," paper SPE 36754 presented at the 1996 SPE Annual Technical Conference and Exhibition, Denver, Oct. 6-9.
26. Larsen, Leif: "Determination of Pressure-Transient and Productivity Data for Deviated Wells in Layered Reservoirs," *SPEFE* (Feb. 1999) 95-103.
27. Larsen, Leif: "Productivities of Fractured and Nonfractured Deviated Wells in Commingled Layered Reservoirs," *SPEJ* (June 1998) 191-199.
28. Larsen, Leif: "Pressure-Transient Behavior of Multibranch Wells in Layered Reservoirs," *SPEFE* (Feb. 2000) 68-73.
29. Jensen, B., Fougner, A.H., and Larsen, L.: "Interference Testing to Verify Drainage Strategy for a Large Offshore Development," paper SPE 56420 presented at the 1999 SPE Annual Technical Conference and Exhibition, Houston, Oct. 3-6.



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30. Nilsen, F. and Larsen, L.: "Inflow Predictions and Testing While Underbalanced Drilling," paper SPE 56684 presented at the 1999 SPE Annual Technical Conference and Exhibition, Houston, Oct. 3-6.
31. Bale, A., Larsen, L., Tudor, D.T., and Buchanan, A.: "Propped Fracturing as a Tool for Prevention and Removal of Formation Damage," paper SPE 68913 presented at the 2001 SPE European Formation Damage Conference, The Hague, May 21-22.
32. Larsen, L.: "General Productivity Models for Wells in Homogeneous and Layered Reservoirs," paper SPE 71613 presented at the 2001 SPE Annual Technical Conference and Exhibition, New Orleans, Sept. 30-Oct. 3.
33. Larsen, L.: "Uncertainties in Standard Analyses of Boundary Effects in Buildup Data," *SPEE* (Oct. 2005) 437-444.
34. Larsen, L.: "Modeling and Analyzing Source and Interference Data From Packer-Probe and Multiprobe Tests," paper SPE 102698 presented at the 2006 SPE Annual Technical Conference and Exhibition, San Antonio, Sept. 24-27.
35. Larsen, L.: "Boundary Effects and Depth of Investigation From Long Buildups Following Short Flow Tests," paper SPE 102699 presented at the 2006 SPE Annual Technical Conference and Exhibition, San Antonio, Sept. 24-27.
36. Larsen, L. and Straub, R.B.: "Determination of Connected Volume and Connectivity From Extended Tests in Compartmentalized and Layered Reservoirs," paper SPE 1110011 presented at the 2007 SPE Annual Technical Conference and Exhibition, Anaheim, California, Nov. 11-14.
37. Larsen, L.: "Analyzing Buildup Data Following a Highly Unstable Rate History," paper SPE 106738 presented at the 2008 SPE Annual Technical Conference and Exhibition, Denver, Colorado, Sept. 21-24.
38. Larsen, L.: "Horizontal Fractures in Single and Multilayer Reservoirs," paper CSUG/SPE 147004 presented at the 2011 Canadian Unconventional Resources Conference, Calgary, Alberta, Canada, 15-17 November, 2011.
39. Hettema, M.H.H., Jøranson, H. and Larsen, L.: "Characterization of two shallow aquifers for produced water injection," presented at the 46th US Rock Mechanics / Geomechanics Symposium, Chicago, Illinois, 24-27 June, 2012.
40. Senger, K., Tveranger, J., Ogata, K., Braathen, A., Olaussen, S., Pettersen, Ø. and Larsen, L.: "Theoretical Storage Capacity Assessment of an Unconventional CO₂ Storage Site in the High Arctic, Svalbard, Norway," poster presented at 3P Arctic Conference & Exhibition, Stavanger, Norway, 15-18 October, 2013.