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Referências Bibliográficas

ALMEIDA, L. F. **Otimização de Alternativas para Desenvolvimento de Campo de Petróleo utilizando Computação Evolucionária**, Dissertação de Mestrado, DEEPUC/RJ, 2003.

BACK, T. **Evolutionary Algorithms in Theory and Practice**, Oxford University Press, 1996.

BITTENCOURT, A. C. **Optimizing Hydrocarbon Field Development Using a Genetic Algorithm Based Approach**. PhD thesis, Stanford University, 1997.

BITTENCOURT, A. C.; HORNE, R. N. **Reservoir Development and Design Optimization**, SPE 38895 presented at the 1997 SPE Annual Technical Conference and Exhibition, San Antonio, Texas, October 5-8, 1997.

BOSWORTH, S.; EL-SAYED, H.; ISMAIL, G.; OHMER, H.; STRACKE, M.; WEST, C.; RETNANTO, A. **Key Issues in Multilateral Technology**. Schlumberger Oilfield Review, winter, pp 14–28, 1998.

BRUCE, G. H. et al. **Calculations of Unsteady-state Gas Flow through Porous Media**, Trans. AIME, 198, 79, 1953.

CMG. **IMEX Advanced Oil/Gas Reservoir Simulator: Version 2008 User's Guide**, Computer Modelling Group LTD., Calgary, Alberta, Canada, 2008, 1079p.

CRICHLOW, H. B. **A Simulation Approach**, Prentice-Hall, In: **Modern Reservoir Engineering Inc. Englewood Cliffs**, New Jersey 07632, 1977.

DAVIS, L. **Adapting operator probabilities in genetic algorithms**, In: J. David Schafer(ed.), **Proceedings of the Third International Conference on Genetic Algorithms**. San Mateo, Calif.: Morgan Kaufmann Publishers, 1989.

DAVIS, L. **Handbook of Genetic Algorithms**, Van Nostrand Reinhold, USA, 1991.

DARWIN, C. **On the Origin of Species by Means of Natural Selection, or the Preservation of Favoured Races in the Struggle for Life**, London: John Murray, Albemarle Street, 1859.

DOLLE, N.; BROUWER, D. R.; JANSEN, J. D. **Dynamic Optimization of Water Flooding with Multiple Injectors and Producers Using Optimal Control Theory**, paper presented at the XV International Conference on Computational Methods in Water Resources. Delft, Netherlands, 23-28 June, 2002.

DURHAM, W. **Co-Evolution: Genes, Culture and Human Diversity**. Stanford University Press, Stanford, CA, 1994.

EMERICK, A. A.; SILVA, E.; MESSER, B.; ALMEIDA, L. F.; SZWARCMAN, D.; PACHECO, M. A. C.; VELLASCO, M. M. B. R. **Well Placement Optimization Using a Genetic Algorithm With Nonlinear Constraints**. In: SPE Reservoir Simulation Symposium, 2009, The Woodlands, SPE 118808, 2009.

FOGEL, L.J.; OWENS, A.J.; WALSH, M.J. **Artificial Intelligence Through Simulated Evolution**, John Wiley and Sons, NY, 1966.

FRAIJA, J.; OHMER, H.; PULICK, T.; JARDON, M.; KAJA, M.; PAEZ, R.; SOTOMAYOR, G. P. G.; UMUDJORO K. **New Aspects of Multilateral Well Construction**, Oilfield Review, Schlumberger, Outubro, Brasil, 52-69, 2002.

GOLDBERG, D. E. **Genetic Algorithms in Search, Optimization, and machine Learning**, Addison-Wesley Publishing Company, Inc.1989.

GUYAGULER, B.; HORNE, R. **Optimization of Well Placment**, Journal of Energy Resources Technology 122(2), pp.64-70 (June 2000). (also Presented at the Petroleum Production Technology Symposium for ETCE 2000, New Orleans, Louisiana).

GUYAGULER, B.; HoRne, R.; ROGERS, L.; ROSENZWEIG, J.J. **Optimization of Well Placement in a Gulf of Mexico Water Flooding Project**, SPE 63221 presented at the 2000 SPE Annual Technical Conference and exhibition, Dallas, Texas, October, 2000.

HAMER, D.; FREEMAN, A. **The Business Case for Multilateral Wells**, Petroleum Engineering International, May, 1999, pp 25–29.

JOSHI, S. D. **Horizontal Well Technology**, PennWell Books, Tulsa, OK, 1991, 535p.

KOZA, J. R. **Genetic Programming: On the Programming of Computers by Means of Natural Selection**, MIT Press, USA, 1992, 840p.

MICHALEWICZ, Z. **Genetic Algorithms + Data Structures = Evolution Programs**, Springer Verlag, USA, 1996.

MITCHELL, M. **An Introduction to Genetic Algorithms**, the MIT Press, USA, 1994.

NAKAJIMA, L., **Otimização de Desempenho de Poços Horizontais no Desenvolvimento de Campos de Petróleo**, dissertação de mestrado, Ciências e Engenharia de Petróleo, Universidade Estadual de Campinas, 2003.

NASH, J. **Equilibrium points in n-person games**. Proceedings of the National Academy of Sciences, 36(1):48-49, 1950.

NOCEDAL, J., WRIGHT, S. J., **Numerical Optimization**, Springer-Verlag Berlin and Heidelberg GmbH & Co. KG, 1999.

PACHECO, M. A. C.; VELLASCO, M. M. B. R. (Eds.). **Intelligent Systems in Oil Field Development under Uncertainty**, Série Studies in Computational Intelligence, Ed. Springer Berlin / Heidelberg, 2009, 288p.

POTTER, M. A.; De JONG, K. A. **Cooperative Coevolution: An Architecture for Evolving Coadapted Subcomponents**, Evolutionary Computation 8(1): 1-29, 2000.

ROCHA, L.A.S.; AZUAGA, D.; ANDRADE, R.; VIEIRA, J.L.B.; SANTOS, O.L.A. **Perfuração Direcional**. 2.ed. Rio de Janeiro: Interciência: Petrobras: IBP, 2008, 323p.

SUGIYAMA, H.; PEDEN, J. M.; NICOLL, G. **The Optimal Application of Multi-Lateral/Multi Branch Completions**, paper SPE 38033 presented at the SPE Asia Pacific Oil and Gas Conference, Kuala Lumpur, Malaysia, 14-16 April. 1997.

THOMAS, J. E.; TRIGGIA, A. A.; CORREIA, C. A.; VEROTI, C.; SOUZA, J. E.; PAULA, J. L.; ROSSI, N. C.; PITOMBO, N. E.; GOUVÊA, P. C.; CARVALHO, E.; BARRAGAN, R. V. **Fundamentos de Engenharia de Petróleo**, Rio de Janeiro, Interciência, 2001, 271p.

TÚPAC, Y. J. **Sistema Inteligente de Otimização de Alternativas de Desenvolvimento de Campos Petrolíferos**, Tese de Doutorado, DEE-PUC / RJ, 2005.

TUPÁC, Y. J. **Otimização de Alternativas para Desenvolvimento de Campos de Petróleo sob Condições de Certeza**. Engenharia Térmica, Programa Interdisciplinar em Engenharia do Petróleo e Gás Natural. RETERM. Edição Especial, n.2. 2002 .issn-1676-1790, 2002.

UNIVERSIDADE PETROBRAS. **Notas de aula do curso de formação de Engenheiro de Petróleo**, capítulo de Perfuração de Poços Multilaterais, 2006.

VIJ, S. K.; NARASIAH, S. L.; WALIA, A.; SINGH, G. **Multilateral: An Overview and Issues Involved in Adopting This Technology**, paper SPE 39509, Oil and Natural Gas Corporation, 1998.

YETEN, B. **Optimum Deployment of Nonconvencional Wells**, PhD Thesis, Stanford, 2003.

ZEBULUM, R. S.; PACHECO, M. A. C.; VELLASCO, M. M. B. R. **Evolutionary Electronics: Automatic Design of Electronic Circuits and Systems by Genetic Algorithms**. CRC Press, Boca Raton, Florida, 2001.

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Apêndice A

8.1. Reservatório 2

Modelo do reservatório 2:

```
*TITLE1 'line'
*INUNIT *MODSI
*OUTPRN *WELL *BRIEF
*OUTPRN *GRID *NONE
*OUTPRN *TABLES *NONE
*OUTPRN *RES *NONE
*WSRF *WELL 1
*WSRF *GRID 1
*OUTSRF *WELL *ALL
*OUTSRF *GRID *PRES *SW *SO
RESULTS XOFFSET          0.0000
RESULTS YOFFSET          0.0000
RESULTS ROTATION          0.0000
RESULTS AXES-DIRECTIONS 1.0 1.0 1.0

GRID CART 30 30 1
KDIR UP
DI CON 100
DJ CON 100
DK CON 50
DTOP 900*0

NULL CON                1
POR CON                 0.2
PERMI CON              10
PERMJ EQUALSI
PERMK EQUALSI
PINCHOUTARRAY CON      1
SECTORARRAY 'OilReg'  ALL
  425*0 13*1 17*0 13*1 17*0 13*1 17*0 13*1 17*0 13*1 342*0
SECTORARRAY 'PureOil' ALL
  487*0 9*1 404*0
PRPOR 200
CPOR 1e-5
MODEL BLACKOIL
TRES 70
PVT ZG 1

**$          p          Rs          Bo          z          viso          visg
  1.033512  0.691811  1.060850  0.295734  8.992717  0.005464
  4.145154  1.69268   1.063113  0.295735  8.521406  0.009372
  7.256797  2.81248   1.065657  0.295732  8.047870  0.013086
 10.368439  4.01557   1.068402  0.290511  7.593067  0.017240
 13.480081  5.28406   1.071312  0.288967  7.164903  0.021652
 16.591722  6.60696   1.074363  0.287436  6.766004  0.026501
 19.703363  7.97673   1.077538  0.285907  6.396483  0.031845
```

Apêndice A

22.815006	9.38785	1.080827	0.284395	6.055212	0.037734
25.926649	10.8361	1.084220	0.282885	5.740470	0.044220
29.038292	12.3181	1.087711	0.281404	5.450296	0.051357
32.149937	13.8311	1.091293	0.279908	5.182682	0.059201
35.261578	15.3728	1.094963	0.27845	4.935676	0.067809
38.373219	16.9413	1.098715	0.277004	4.707439	0.077242
41.484859	18.5349	1.102548	0.27559	4.496269	0.087568
44.596500	20.1521	1.106457	0.274182	4.300607	0.098854
47.708141	21.7918	1.110441	0.272759	4.119039	0.111174
136.559021	84.4437	1.25	0.25	1.769343	1.352840
225.409882	212.712	1.425471	0.251771	1.104641	5.967701
314.260773	401.762	1.630924	0.277693	0.804184	14.028974
403.111633	644.233	1.861210	0.311312	0.634863	23.863567

BWI 1.033549
 CO 0.000379
 CVO 0.007112
 CVW 0.000254
 PTYPE CON 1
 CW 0.000039
 DENSITY OIL 915.857605
 DENSITY WATER 1071.860840
 REFPW 44.599998
 VWI 0.433018
 GRAVITY GAS 0.800000
 *ROCKFLUID
 *RPT 1
 *SWT
 0.200000 0.000000 0.800000 0.000000
 0.225000 0.000750 0.722000 0.000000
 0.250000 0.003000 0.648000 0.000000
 0.275000 0.006750 0.578000 0.000000
 0.300000 0.012000 0.512000 0.000000
 0.325000 0.018750 0.450000 0.000000
 0.350000 0.027000 0.392000 0.000000
 0.375000 0.036750 0.338000 0.000000
 0.400000 0.048000 0.288000 0.000000
 0.425000 0.060750 0.242000 0.000000
 0.450000 0.075000 0.200000 0.000000
 0.475000 0.090750 0.162000 0.000000
 0.500000 0.108000 0.128000 0.000000
 0.525000 0.126750 0.098000 0.000000
 0.550000 0.147000 0.072000 0.000000
 0.575000 0.168750 0.050000 0.000000
 0.600000 0.192000 0.032000 0.000000
 0.625000 0.216750 0.018000 0.000000
 0.650000 0.243000 0.008000 0.000000
 0.700000 0.300000 0.000000 0.000000
 *SLT
 0.300000 0.900000 0.000000 0.000000
 0.370000 0.238864 0.008000 0.000000
 0.405000 0.210906 0.018000 0.000000
 0.440000 0.184687 0.032000 0.000000
 0.475000 0.160207 0.050000 0.000000
 0.510000 0.137468 0.072000 0.000000
 0.545000 0.116468 0.098000 0.000000
 0.580000 0.097207 0.128000 0.000000
 0.615000 0.079687 0.162000 0.000000
 0.650000 0.063905 0.200000 0.000000
 0.685000 0.049864 0.242000 0.000000
 0.720000 0.037562 0.288000 0.000000
 0.755000 0.027000 0.338000 0.000000

Apêndice A

```

0.790000 0.018178 0.392000 0.000000
0.825000 0.011095 0.450000 0.000000
0.860000 0.005751 0.512000 0.000000
0.895000 0.002148 0.578000 0.000000
0.930000 0.000284 0.648000 0.000000
0.965000 0.000000 0.722000 0.000000
1.000000 0.000000 0.800000 0.000000
*INITIAL
USER_INPUT
PRES CON          98.3
PB CON            0
SO ALL
  425*0.01 13*0.6 17*0.01 13*0.6 17*0.01 2*0.6 9*0.95 2*0.6 17*0.01
  13*0.6 17*0.01 13*0.6 342*0.01
SW ALL
  425*0.99 13*0.4 17*0.99 13*0.4 17*0.99 2*0.4 9*0.05000001 2*0.4
  17*0.99
  13*0.4 17*0.99 13*0.4 342*0.99
*NUMERICAL
AIM STAB
NCUTS 10
DTMIN 5.0
*RUN
*DATE 2001 1 1
DTWELL 5

*TIME 7201.0

```

8.2.Reservatório 3**Modelo do reservatório 3:**

```

*TITLE1 'lineSingleLat'
*INUNIT *MODSI
*OUTPRN *WELL *BRIEF
*OUTPRN *GRID *NONE
*OUTPRN *TABLES *NONE
*OUTPRN *RES *NONE
*WSRF *WELL 1
*WSRF *GRID 1
*OUTSRF *WELL *ALL
*OUTSRF *GRID *PRES *SW *SO
RESULTS XOFFSET          0.0000
RESULTS YOFFSET          0.0000
RESULTS ROTATION          0.0000
RESULTS AXES-DIRECTIONS 1.0 1.0 1.0

GRID CART 30 30 1
KDIR UP
DI CON 100
DJ CON 100
DK CON 50
DTOP 900*0

NULL CON          1
POR CON           0.2
PERMI CON         10
PERMJ EQUALSI
PERMK EQUALSI
PINCHOUTARRAY CON          1

```

Apêndice A

SECTORARRAY 'OilReg' ALL
 251*0 4*1 26*0 4*1 26*0 4*1 26*0 4*1 26*0 4*1 26*0 4*1 20*0 13*1
 17*0 13*1 17*0 13*1 17*0 13*1 17*0 13*1 342*0
 SECTORARRAY 'PureOil' ALL
 342*0 1 29*0 1 29*0 1 29*0 1 29*0 1 24*0 9*1 404*0
 PRPOR 200
 CPOR 1e-5
 MODEL BLACKOIL
 TRES 70
 PVT ZG 1

**\$	p	Rs	Bo	z	viso	visg
	1.033512	0.691811	1.060850	0.295734	8.992717	0.005464
	4.145154	1.69268	1.063113	0.295735	8.521406	0.009372
	7.256797	2.81248	1.065657	0.295732	8.047870	0.013086
	10.368439	4.01557	1.068402	0.290511	7.593067	0.017240
	13.480081	5.28406	1.071312	0.288967	7.164903	0.021652
	16.591722	6.60696	1.074363	0.287436	6.766004	0.026501
	19.703363	7.97673	1.077538	0.285907	6.396483	0.031845
	22.815006	9.38785	1.080827	0.284395	6.055212	0.037734
	25.926649	10.8361	1.084220	0.282885	5.740470	0.044220
	29.038292	12.3181	1.087711	0.281404	5.450296	0.051357
	32.149937	13.8311	1.091293	0.279908	5.182682	0.059201
	35.261578	15.3728	1.094963	0.27845	4.935676	0.067809
	38.373219	16.9413	1.098715	0.277004	4.707439	0.077242
	41.484859	18.5349	1.102548	0.27559	4.496269	0.087568
	44.596500	20.1521	1.106457	0.274182	4.300607	0.098854
	47.708141	21.7918	1.110441	0.272759	4.119039	0.111174
	136.559021	84.4437	1.25	0.25	1.769343	1.352840
	225.409882	212.712	1.425471	0.251771	1.104641	5.967701
	314.260773	401.762	1.630924	0.277693	0.804184	14.028974
	403.111633	644.233	1.861210	0.311312	0.634863	23.863567

BWI 1.033549
 CO 0.000379
 CVO 0.007112
 CVW 0.000254
 PTYPE CON 1
 CW 0.000039
 DENSITY OIL 915.857605
 DENSITY WATER 1071.860840
 REFPW 44.599998
 VWI 0.433018
 GRAVITY GAS 0.800000

*ROCKFLUID

*RPT 1

*SWT

0.200000	0.000000	0.800000	0.000000
0.225000	0.000750	0.722000	0.000000
0.250000	0.003000	0.648000	0.000000
0.275000	0.006750	0.578000	0.000000
0.300000	0.012000	0.512000	0.000000
0.325000	0.018750	0.450000	0.000000
0.350000	0.027000	0.392000	0.000000
0.375000	0.036750	0.338000	0.000000
0.400000	0.048000	0.288000	0.000000
0.425000	0.060750	0.242000	0.000000
0.450000	0.075000	0.200000	0.000000
0.475000	0.090750	0.162000	0.000000
0.500000	0.108000	0.128000	0.000000
0.525000	0.126750	0.098000	0.000000
0.550000	0.147000	0.072000	0.000000

Apêndice A

```

0.575000 0.168750 0.050000 0.000000
0.600000 0.192000 0.032000 0.000000
0.625000 0.216750 0.018000 0.000000
0.650000 0.243000 0.008000 0.000000
0.700000 0.300000 0.000000 0.000000
*SLT
0.300000 0.900000 0.000000 0.000000
0.370000 0.238864 0.008000 0.000000
0.405000 0.210906 0.018000 0.000000
0.440000 0.184687 0.032000 0.000000
0.475000 0.160207 0.050000 0.000000
0.510000 0.137468 0.072000 0.000000
0.545000 0.116468 0.098000 0.000000
0.580000 0.097207 0.128000 0.000000
0.615000 0.079687 0.162000 0.000000
0.650000 0.063905 0.200000 0.000000
0.685000 0.049864 0.242000 0.000000
0.720000 0.037562 0.288000 0.000000
0.755000 0.027000 0.338000 0.000000
0.790000 0.018178 0.392000 0.000000
0.825000 0.011095 0.450000 0.000000
0.860000 0.005751 0.512000 0.000000
0.895000 0.002148 0.578000 0.000000
0.930000 0.000284 0.648000 0.000000
0.965000 0.000000 0.722000 0.000000
1.000000 0.000000 0.800000 0.000000
*INITIAL
USER_INPUT
PRES CON          98.3
PB CON            0
SO ALL
 251*0.01 4*0.6 26*0.01 4*0.6 26*0.01 4*0.6 26*0.01 0.6 0.95 2*0.6
 26*0.01 0.6 0.95 2*0.6 26*0.01 0.6 0.95 2*0.6 20*0.01 7*0.6 0.95
 5*0.6
 17*0.01 7*0.6 0.95 5*0.6 17*0.01 2*0.6 9*0.95 2*0.6 17*0.01
 13*0.6
 17*0.01 13*0.6 342*0.01
SW ALL
 251*0.99 4*0.4 26*0.99 4*0.4 26*0.99 4*0.4 26*0.99 0.4 0.05000001
 2*0.4 26*0.99 0.4 0.05000001 2*0.4 26*0.99 0.4 0.05000001 2*0.4
 20*0.99
 7*0.4 0.05000001 5*0.4 17*0.99 7*0.4 0.05000001 5*0.4 17*0.99
 2*0.4
 9*0.05000001 2*0.4 17*0.99 13*0.4 17*0.99 13*0.4 342*0.99
*NUMERICAL
AIM STAB
NCUTS 10
DTMIN 5.0
*RUN
*DATE 2001 1 1
DTWELL 5

*TIME 7201.0

```

8.3.Reservatório 4**Modelo do reservatório 4:**

```

*TITLE1 'vertical'
*INUNIT *MODSI
*OUTPRN *WELL *BRIEF
*OUTPRN *GRID *NONE

```


Apêndice A

```

*OUTPRN *TABLES *NONE
*OUTPRN *RES *NONE
*WSRF *WELL 1
*WSRF *GRID 1
*OUTSRF *WELL *ALL
*OUTSRF *GRID *PRES *SW *SO
RESULTS XOFFSET      0.0000
RESULTS YOFFSET      0.0000
RESULTS ROTATION     0.0000

GRID CART 30 30 3
KDIR UP
DI CON 100
DJ CON 100
DK CON 100
DTOP 900*1150

NULL CON              1
POR CON 0.2
PERMI CON             10
PERMJ EQUALSI
PERMK EQUALSI
PRPOR 200
CPOR 1e-5
PINCHOUTARRAY CON    1
SECTORARRAY 'OilReg' ALL
  454*0 5*1 25*0 5*1 25*0 5*1 25*0 5*1 25*0 5*1 775*0 5*1 25*0 5*1
  25*0 5*1
  25*0 5*1 25*0 5*1 775*0 5*1 25*0 5*1 25*0 5*1 25*0 5*1 25*0 5*1
  321*0
SECTORARRAY 'PureOil' ALL
  516*0 1 899*0 1 899*0 1 383*0
MODEL BLACKOIL
TRES 70
PVT ZG 1

**$          p          Rs          Bo          z          viso          visg
  1.033512   0.691811   1.060850   0.295734   8.992717   0.005464
  4.145154   1.692268   1.063113   0.295735   8.521406   0.009372
  7.256797   2.81248    1.065657   0.295732   8.047870   0.013086
 10.368439   4.01557    1.068402   0.290511   7.593067   0.017240
 13.480081   5.28406    1.071312   0.288967   7.164903   0.021652
 16.591722   6.60696    1.074363   0.287436   6.766004   0.026501
 19.703363   7.97673    1.077538   0.285907   6.396483   0.031845
 22.815006   9.38785    1.080827   0.284395   6.055212   0.037734
 25.926649  10.8361    1.084220   0.282885   5.740470   0.044220
 29.038292  12.3181    1.087711   0.281404   5.450296   0.051357
 32.149937  13.8311    1.091293   0.279908   5.182682   0.059201
 35.261578  15.3728    1.094963    0.27845    4.935676   0.067809
 38.373219  16.9413    1.098715   0.277004   4.707439   0.077242
 41.484859  18.5349    1.102548    0.27559    4.496269   0.087568
 44.596500  20.1521    1.106457   0.274182   4.300607   0.098854
 47.708141  21.7918    1.110441   0.272759   4.119039   0.111174
 136.559021  84.4437     1.25        0.25    1.769343   1.352840
 225.409882 212.712    1.425471   0.251771   1.104641   5.967701
 314.260773 401.762    1.630924   0.277693   0.804184  14.028974
 403.111633 644.233    1.861210   0.311312   0.634863  23.863567

BWI 1.033549
CO 0.000379
CVO 0.007112
CVW 0.000254

```

Apêndice A

```

PCTYPE CON          1
CW 0.000039
DENSITY OIL 915.857605
DENSITY WATER 1071.860840
REFPW 44.599998
VWI 0.433018
GRAVITY GAS 0.800000
*ROCKFLUID
*RPT 1
*SWT
 0.200000 0.000000 0.800000 0.000000
 0.225000 0.000750 0.722000 0.000000
 0.250000 0.003000 0.648000 0.000000
 0.275000 0.006750 0.578000 0.000000
 0.300000 0.012000 0.512000 0.000000
 0.325000 0.018750 0.450000 0.000000
 0.350000 0.027000 0.392000 0.000000
 0.375000 0.036750 0.338000 0.000000
 0.400000 0.048000 0.288000 0.000000
 0.425000 0.060750 0.242000 0.000000
 0.450000 0.075000 0.200000 0.000000
 0.475000 0.090750 0.162000 0.000000
 0.500000 0.108000 0.128000 0.000000
 0.525000 0.126750 0.098000 0.000000
 0.550000 0.147000 0.072000 0.000000
 0.575000 0.168750 0.050000 0.000000
 0.600000 0.192000 0.032000 0.000000
 0.625000 0.216750 0.018000 0.000000
 0.650000 0.243000 0.008000 0.000000
 0.700000 0.300000 0.000000 0.000000
*SLT
 0.300000 0.900000 0.000000 0.000000
 0.370000 0.238864 0.008000 0.000000
 0.405000 0.210906 0.018000 0.000000
 0.440000 0.184687 0.032000 0.000000
 0.475000 0.160207 0.050000 0.000000
 0.510000 0.137468 0.072000 0.000000
 0.545000 0.116468 0.098000 0.000000
 0.580000 0.097207 0.128000 0.000000
 0.615000 0.079687 0.162000 0.000000
 0.650000 0.063905 0.200000 0.000000
 0.685000 0.049864 0.242000 0.000000
 0.720000 0.037562 0.288000 0.000000
 0.755000 0.027000 0.338000 0.000000
 0.790000 0.018178 0.392000 0.000000
 0.825000 0.011095 0.450000 0.000000
 0.860000 0.005751 0.512000 0.000000
 0.895000 0.002148 0.578000 0.000000
 0.930000 0.000284 0.648000 0.000000
 0.965000 0.000000 0.722000 0.000000
 1.000000 0.000000 0.800000 0.000000
*INITIAL
USER_INPUT
PRES KVAR
 98.3 100.9 103.5
PB CON          44.6
SO ALL
 454*0.01 5*0.3 25*0.01 5*0.3 25*0.01 2*0.3 0.95 2*0.3 25*0.01
5*0.3
 25*0.01 5*0.3 775*0.01 5*0.3 25*0.01 5*0.3 25*0.01 2*0.3 0.95
2*0.3

```

Apêndice A

```

25*0.01 5*0.3 25*0.01 5*0.3 775*0.01 5*0.3 25*0.01 5*0.3 25*0.01
2*0.3
0.95 2*0.3 25*0.01 5*0.3 25*0.01 5*0.3 321*0.01
SW ALL
454*0.99 5*0.7 25*0.99 5*0.7 25*0.99 2*0.7 0.05000001 2*0.7
25*0.99
5*0.7 25*0.99 5*0.7 775*0.99 5*0.7 25*0.99 5*0.7 25*0.99 2*0.7
0.05000001
2*0.7 25*0.99 5*0.7 25*0.99 5*0.7 775*0.99 5*0.7 25*0.99 5*0.7
25*0.99
2*0.7 0.05000001 2*0.7 25*0.99 5*0.7 25*0.99 5*0.7 321*0.99
*NUMERICAL
*AIM *STAB
*NCUTS 10
*DTMIN 5.0
*RUN
*DATE 2001 1 1
*DTWELL 5.0

```

```
*TIME 7201.0
```

8.4.Reservatório 5**Modelo do reservatório 3:**

```

*TITLE1 'veticalLateral'
*INUNIT *MODSI
*OUTPRN *WELL *BRIEF
*OUTPRN *GRID *NONE
*OUTPRN *TABLES *NONE
*OUTPRN *RES *NONE
*WSRF *WELL 1
*WSRF *GRID 1
*OUTSRF *WELL *ALL
*OUTSRF *GRID *PRES *SW *SO
RESULTS XOFFSET          0.0000
RESULTS YOFFSET          0.0000
RESULTS ROTATION         0.0000

GRID CART 30 30 3
KDIR UP
DI CON 100
DJ CON 100
DK CON 100
DTOP 900*1150

NULL CON                  1
POR CON 0.2
PERMI CON                 10
PERMJ EQUALSI
PERMK EQUALSI
PRPOR 200
CPOR 1e-5
PINCHOUTARRAY CON       1

SECTORARRAY 'OilReg' ALL
454*0 5*1 25*0 5*1 25*0 5*1 25*0 5*1 25*0 5*1 775*0 6*1 24*0 6*1
24*0 6*1
24*0 6*1 24*0 6*1 774*0 5*1 25*0 5*1 25*0 5*1 25*0 5*1 25*0 5*1
321*0
SECTORARRAY 'PureOil' ALL
516*0 1 899*0 3*1 897*0 1 383*0

```

Apêndice A

MODEL BLACKOIL
TRES 70
PVT ZG 1

**\$	p	Rs	Bo	z	viso	visg
	1.033512	0.691811	1.060850	0.295734	8.992717	0.005464
	4.145154	1.69268	1.063113	0.295735	8.521406	0.009372
	7.256797	2.81248	1.065657	0.295732	8.047870	0.013086
	10.368439	4.01557	1.068402	0.290511	7.593067	0.017240
	13.480081	5.28406	1.071312	0.288967	7.164903	0.021652
	16.591722	6.60696	1.074363	0.287436	6.766004	0.026501
	19.703363	7.97673	1.077538	0.285907	6.396483	0.031845
	22.815006	9.38785	1.080827	0.284395	6.055212	0.037734
	25.926649	10.8361	1.084220	0.282885	5.740470	0.044220
	29.038292	12.3181	1.087711	0.281404	5.450296	0.051357
	32.149937	13.8311	1.091293	0.279908	5.182682	0.059201
	35.261578	15.3728	1.094963	0.27845	4.935676	0.067809
	38.373219	16.9413	1.098715	0.277004	4.707439	0.077242
	41.484859	18.5349	1.102548	0.27559	4.496269	0.087568
	44.596500	20.1521	1.106457	0.274182	4.300607	0.098854
	47.708141	21.7918	1.110441	0.272759	4.119039	0.111174
	136.559021	84.4437	1.25	0.25	1.769343	1.352840
	225.409882	212.712	1.425471	0.251771	1.104641	5.967701
	314.260773	401.762	1.630924	0.277693	0.804184	14.028974
	403.111633	644.233	1.861210	0.311312	0.634863	23.863567

BWI 1.033549

CO 0.000379

CVO 0.007112

CVW 0.000254

PTYPE CON 1

CW 0.000039

DENSITY OIL 915.857605

DENSITY WATER 1071.860840

REFPW 44.599998

VWI 0.433018

GRAVITY GAS 0.800000

*ROCKFLUID

*RPT 1

*SWT

0.200000	0.000000	0.800000	0.000000
0.225000	0.000750	0.722000	0.000000
0.250000	0.003000	0.648000	0.000000
0.275000	0.006750	0.578000	0.000000
0.300000	0.012000	0.512000	0.000000
0.325000	0.018750	0.450000	0.000000
0.350000	0.027000	0.392000	0.000000
0.375000	0.036750	0.338000	0.000000
0.400000	0.048000	0.288000	0.000000
0.425000	0.060750	0.242000	0.000000
0.450000	0.075000	0.200000	0.000000
0.475000	0.090750	0.162000	0.000000
0.500000	0.108000	0.128000	0.000000
0.525000	0.126750	0.098000	0.000000
0.550000	0.147000	0.072000	0.000000
0.575000	0.168750	0.050000	0.000000
0.600000	0.192000	0.032000	0.000000
0.625000	0.216750	0.018000	0.000000
0.650000	0.243000	0.008000	0.000000
0.700000	0.300000	0.000000	0.000000

*SLT

0.300000	0.900000	0.000000	0.000000
----------	----------	----------	----------

Apêndice A

0.370000 0.238864 0.008000 0.000000
 0.405000 0.210906 0.018000 0.000000
 0.440000 0.184687 0.032000 0.000000
 0.475000 0.160207 0.050000 0.000000
 0.510000 0.137468 0.072000 0.000000
 0.545000 0.116468 0.098000 0.000000
 0.580000 0.097207 0.128000 0.000000
 0.615000 0.079687 0.162000 0.000000
 0.650000 0.063905 0.200000 0.000000
 0.685000 0.049864 0.242000 0.000000
 0.720000 0.037562 0.288000 0.000000
 0.755000 0.027000 0.338000 0.000000
 0.790000 0.018178 0.392000 0.000000
 0.825000 0.011095 0.450000 0.000000
 0.860000 0.005751 0.512000 0.000000
 0.895000 0.002148 0.578000 0.000000
 0.930000 0.000284 0.648000 0.000000
 0.965000 0.000000 0.722000 0.000000
 1.000000 0.000000 0.800000 0.000000

*INITIAL

USER_INPUT

PRES KVAR

98.3 100.9 103.5

44.6

PB CON 44.6

SO ALL

454*0.01 5*0.3 25*0.01 5*0.3 25*0.01 2*0.3 0.95 2*0.3 25*0.01

5*0.3

25*0.01 5*0.3 775*0.01 6*0.3 24*0.01 6*0.3 24*0.01 2*0.3 3*0.95

0.3

24*0.01 6*0.3 24*0.01 6*0.3 774*0.01 5*0.3 25*0.01 5*0.3 25*0.01

2*0.3

0.95 2*0.3 25*0.01 5*0.3 25*0.01 5*0.3 321*0.01

SW ALL

454*0.99 5*0.7 25*0.99 5*0.7 25*0.99 2*0.7 0.05000001 2*0.7

25*0.99

5*0.7 25*0.99 5*0.7 775*0.99 6*0.7 24*0.99 6*0.7 24*0.99 2*0.7

3*0.05000001

0.7 24*0.99 6*0.7 24*0.99 6*0.7 774*0.99 5*0.7 25*0.99 5*0.7

25*0.99

2*0.7 0.05000001 2*0.7 25*0.99 5*0.7 25*0.99 5*0.7 321*0.99

*NUMERICAL

*AIM *STAB

*NCUTS 10

*DTMIN 5.0

*RUN

*DATE 2001 1 1

*DTWELL 5.0

*TIME 7201.0