

PUBLICATIONS

Books

1. Todinov M.T., (2021), Interpretation of Algebraic Inequalities Practical Engineering Optimisation and Generating New Knowledge, CRC press, Taylor and Francis Group.
<https://www.routledge.com/Interpretation-of-Algebraic-Inequalities-Practical-Engineering-Optimisation/Todinov/p/book/9781032059174>
2. Todinov M.T., (2020) Risk and uncertainty reduction by using algebraic inequalities, CRC press, Taylor and Francis Group.
<https://www.routledge.com/Risk-and-Uncertainty-Reduction-by-Using-Algebraic-Inequalities/Todinov/p/book/9780367898007>
3. Todinov M.T. (2019), Methods for reliability improvement and risk reduction, Wiley,
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4. Todinov M.T. (2016) Reliability and risk models: Setting reliability requirements 2nd ed., Wiley.
https://www.amazon.co.uk/Reliability-Risk-Models-Requirements-Engineering-ebook/dp/B01B6Q7ROI/ref=sr_1_1?dchild=1&keywords=Reliability+and+risk+models%3A+Setting+reliability+requirements&qid=1635006212&s=books&sr=1-1
5. Todinov M.T., (2013) *Flow networks: Analysis and optimisation of repairable flow networks, networks with disturbed flows and reliability networks*, Elsevier.
http://www.amazon.co.uk/Flow-Networks-optimization-repairable-reliability/dp/0123983967/ref=sr_1_3?s=books&ie=UTF8&qid=1360336186&sr=1-3
6. Todinov M.T. (2007) *Risk-based reliability analysis and generic principles for risk reduction*, Elsevier-08-044728-7.
<https://www.elsevier.com/books/risk-based-reliability-analysis-and-generic-principles-for-risk-reduction/todinov/978-0-08-044728-5>

Book chapters

7. Todinov M.T., Virtual accelerated life testing of complex systems, In *Intelligent Decision Systems in Large-Scale Distributed Environment*, Bouvry, Pascal; González-Vélez, Horacio; Kolodziej, Joanna (Eds.), Springer, (2011), pp.293-314.
8. Todinov M.T., (2020), "Combining Domain-Independent Methods and Domain-Specific Knowledge to Achieve Effective Risk and Uncertainty Reduction", in *Handbook of Advanced Performability Engineering*, K. B. Misra (ed.), pp. 679-696, https://doi.org/10.1007/978-3-030-55732-4_30
9. Todinov M.T., Statistics of the structure and properties of inhomogeneous materials, In *Random Material Microstructures: Modelling and Mechanical Behaviour*, ed. by K.Sobczyk, Institute of Fundamental Technological Research, Polish Academy of Sciences, Warsaw, (2004), ISSN 1642-0578.

- **Application of algebraic inequalities for generating new knowledge, reducing uncertainty and risk and optimising systems and processes**

Journal papers:

10. Todinov, M.T, (2021). Creating relevant meaning for algebraic inequalities to achieve uncertainty and risk reduction, Proc IMechE Part O: Journal of Risk and Reliability, to appear.
11. Todinov, M.T, (2021). A general class of algebraic inequalities for generating new knowledge and optimising the design of systems and processes, uncertainty and risk reduction, Proc IMechE Part O: Journal of Risk and Reliability, to appear.
12. Todinov M.T., (2021). Generation of new knowledge and optimisation of systems and processes through meaningful interpretation of algebraic inequalities, *International journal of mathematical modelling and numerical optimisation*, 11(4), pp.428-449.
13. Todinov M.T. (2020). On two fundamental approaches for reliability improvement and risk reduction by using algebraic inequalities, *Quality and reliability engineering international*, DOI 10.1002/qre.2766.
14. Todinov M.T. (2020). Using algebraic inequalities to reduce uncertainty and risk, *ASCE-ASME Journal of Risk and Uncertainty in Engineering Systems, Part B: Mechanical Engineering*, 6(4), doi.org/10.1115/1.4048403.
15. Todinov M.T., (2020). Reducing uncertainty and obtaining superior performance by segmentation based on algebraic inequalities, *International Journal of reliability and safety*, vol. 14 (2/3), pp-103-115.
16. Todinov M.T. (2019) Reliability improvement and risk reduction by inequalities and segmentation, Proc IMechE Part O: *Journal of Risk and Reliability*, published online, DOI: 10.1177/1748006X19869516.
17. Todinov M.T., (2019) Improving reliability and reducing risk by using inequalities, *Safety and Reliability*, vol. 38 (4), pp.222-245.

Refereed Conference Proceedings

18. Todinov, M.T., (2019), Using Algebraic Inequalities to Support Risk-critical Reasoning, Proceeding of the 29th ESREL2019 conference, 22-26 September Hanover, 2019.

- **Domain-independent methods for improving reliability and reducing uncertainty and risk**

19. Todinov M.T., Reliability improvement and risk reduction by inequalities and segmentation, *Journal of Risk and Reliability*, Proc IMechE Part O: J Risk and Reliability, 234(1) 63–73, 2020,
20. Todinov M.T., Reducing the risk of failure by deliberate weaknesses, *International Journal of Risk and Contingency Management*, 9(2), pp.33-53, 2020.
21. Todinov M.T. Domain-independent approach to risk reduction, *Journal of risk research*, <https://doi.org/10.1080/13669877.2019.1628093>.
22. Todinov M.T., Improving reliability and reducing risk by minimizing the rate of damage accumulation; *Safety and reliability*, 37:2-3, 148-176, DOI: 10.1080/09617353.2018.14686542018.

23. Todinov M.T., Reliability Improvement and Risk Reduction through Self-reinforcement; *International Journal of Risk Assessment and Management*, **22**(1), pp.18 – 43, 2018.
24. Todinov M.T., Reducing risk through inversion and self-strengthening, *International Journal of Risk and contingency Management*, **6**(1),pp.14-42 (2017).
25. Todinov M.T., Reducing risk by segmentation, *International Journal of Risk and contingency Management*, to 6(3) pp.27-46, (2017).
26. Todinov M.T., Improving reliability and reducing risk by separation, *International Journal of Risk and contingency management*, 2017, **6**(4) (2017).
27. Todinov M.T., Mechanisms for improving reliability and reducing risk by stochastic and deterministic separation, *Journal of Risk Research* 22(1):1-27 (2017).
28. Todinov M.T., Reducing risk through segmentation, permutations, time and space exposure, inverse states, and separation, *International Journal of Risk and Contingency Management*, **4**(3), pp.1-21, (2015).

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29. Todinov M.T., New Domain-Independent Methods for Reliability Improvement and Risk Reduction, 3rd International Conference on System Reliability and Safety (ICSRS), November, 2018, Barcelona, DOI 10.1109/ICSRS.2018.00067.

• Repairable flow networks, networks with disturbed flows and static flow networks

Journal Articles

30. Todinov M.T., (2019).Closed parasitic flow loops and dominated loops in networks, *International Journal of Operational Research*, 36 (4), pp.555 - 590.
31. Todinov M.T. Stochastic pruning of flow networks and its application for fast estimation of the production availability, *Electronic Notes in Theoretical Computer Science*, 327, pp.109-123, (2016).
32. Todinov M.T., Optimal connections on a network with multiple interchangeable origins and multiple destinations, *Lecture notes in Management Science*, 8 (2016) 1-7.
33. Todinov M.T., Fast augmentation algorithms for maximising the output flow in repairable flow networks after edge failures, *International Journal of Systems Science*, 44(10), pp.1807-1830 (2013).
34. Todinov M.T., Topology optimisation of repairable flow networks for a maximum average availability, *Computers and Mathematics with Applications*, 64 (2012) pp.3729-3746. doi:10.1016/j.camwa.2012.02.050.
35. Todinov M.T., Algorithms for minimising the lost flow due to failed components in repairable flow networks with complex topology, *International Journal of Reliability and Safety* (2012) **6** (4) pp.283-310.
36. Todinov M.T., The dual network theorem for static flow networks and its application for maximising the throughput Flow, *Artificial Intelligence Research*, 2 (1) (2013) pp.81-106.

37. Todinov M.T., Topology Optimization of Repairable Flow Networks and Reliability Networks, *International Journal of Simulation Systems, Science & Technology*, vol.11, No3, (2011), pp.75-84.
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39. Todinov M.T., Efficient algorithm and discrete-event solver for stochastic flow networks with converging flaws, *International Journal of Reliability and Safety*, **2**(4) (2008) 286-308.
40. Todinov M., Directed and almost-directed flow loops in real networks, *International journal of advanced computer science and applications*, 4(8), pp.152-161 (2013).

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42. Todinov M.T., Optimal connections on a network with multiple interchangeable origins and multiple destinations, *Proceedings of the 8th International Conference on Applied Operational Research*, Rotterdam, June, 2016.
43. Todinov M.T., Fast Augmentation Algorithms for Maximising the Flow in Repairable Flow Networks After a Component Failure, *Proceedings of the 2011 11th IEEE International Conference on Computer and Information Technology*, Paphos, 2011, pp.505-512, DOI 10.1109/CIT.2011.25.
44. Todinov M.T., A fast augmentation algorithm for optimizing the performance of repairable flow networks in real time, Proceedings of ESREL 2011 conference, Troy, 2011, pp.1951-1958.
45. Todinov M.T., Minimizing the lost flow due to component failures for complex repairable flow networks, *Proceedings of the UKsim conference*, Cambridge, 2011.
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48. Todinov M.T., A discrete-event simulator for repairable flow networks with complex topology, *2nd Int Conference on Computational Intelligence, Communication Systems and Networks - 10-J Discrete Event and Real Time Systems*, Liverpool 2010.
49. Todinov M.T., Maximizing the transmitted flow and topology optimization for repairable flow networks without cycles, *Proceedings of the 16th ISSAT Conference*, Washington, 2010.
50. Todinov M.T., Topology optimization for repairable flow networks and safety-critical systems, *Proceedings of the ESREL 2010 Conference*, Rhodes, 2010.
51. Todinov M.T., Analysis and optimization of repairable networks with merging flows, Proceedings of the ESREL 2009 Conference, Prague, 2009.
52. Todinov M.T., A high-speed algorithm for repairable stochastic flow networks with converging flows from multiple sources, Proceedings of the Conference Risk Analysis 2008, Cephalonia, Greece (2008).

• Reliability and Risk modelling

Journal Articles

53. Todinov M.T., Reliability and risk controlled by the simultaneous presence of random events on a time interval, accepted by the ASCE-ASME *Journal of Risk and Uncertainty in Engineering Systems, Part B: Mechanical Engineering*, accepted, published online, ASME doi:10.1115/1.4037519, (2017).
54. Todinov M.T., Evaluating the risk of unsatisfied demand on a time interval, *Artificial Intelligence Research* 5(1) (2016), pp.67-77.
55. Todinov M.T., The same sign local effects principle and its application to technical risk reduction, *International Journal of Safety and Reliability* 9 (4) pp. 311-329, (2015).
56. Todinov M.T., New models for optimal reduction of technical risks, *Engineering Optimisation*, (2012) DOI:10.1080/0305215X.2012.690869.
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58. Todinov M.T., The cumulative stress hazard density as an alternative of the Weibull model, *International journal of Solids and Structures*, **47** (2010) 3286-3296.
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62. Todinov M.T., Potential benefit, potential loss and potential gain from competing opportunity and failure events, *International Journal of Risk Assessment and Management*, **10** (1/2) (2008) 1-30.
63. Todinov M.T., Selecting designs with high resistance to overstress failure initiated by flaws, *Computational Materials Science*, **42** (2008) 306-315.
64. Todinov M.T., A comparative method for improving the reliability of components, *Nuclear Engineering and Design*, **239** (2009) 214-220.
65. Iacopino G., Todinov M.T., Monte Carlo simulation of multiaxial fracture in brittle components containing flaws, *Operation maintenance and materials issues*, **5**(2) (2008) 1-17.
66. Todinov M.T., Risk-based reliability allocation and topological optimisation based on minimising the total cost, *International Journal of Reliability and Safety*, **1** (4) (2007) 489-512.
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70. Todinov M.T., Reliability value analysis of complex production systems based on the losses from

failures, *International journal of Quality, and Reliability Management*, **23** (6) (2006) 696-718.

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73. Todinov M.T., Reliability analysis and setting reliability requirements based on the cost of failure, *International Journal of Reliability, Quality and Safety Engineering*, **11**, (3) (2004) 273-299.
74. Todinov M.T., Uncertainty and risk associated with the Charpy impact energy of multi-run welds, *Nuclear Engineering and Design*, **231**, (2004) 27-38.
75. Todinov M.T., Setting reliability requirements based on minimum failure-free operating periods, *Quality and Reliability Engineering International*, **20**, (2004) 273-287.
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77. Todinov M.T., Reliability governed by the relative locations of random variables in a finite interval, *IEEE Transactions on Reliability*, **53** (2) (2004) 226-237.
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79. Todinov M.T., Estimating the probabilities of triggering brittle fracture associated with the defects in the materials, *Materials Science and Engineering A*, **302/2** (2001) 235-245.
80. Todinov M.T., Necessary and sufficient condition for additivity in the sense of the Palmgren-Miner rule, *Computational Materials Science*, **21** (2001) 101-110.
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82. Todinov M.T., A probabilistic method for predicting fatigue life controlled by defects, *Materials Science and Engineering A*, **A255** (1998) 117-123.
83. Todinov M.T., Probability distribution of fatigue life controlled by defects, *Computers & Structures*, **79** (2001) 313-318.

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84. Todinov M.T., On two optimisation problems related to unsatisfied demand on a time interval, *Proceedings of the 16th International Conference on Computational and Mathematical Methods in Science and Engineering, CMMSE 2016, Rota, 4-8 July, 2016*.
85. Todinov M.T., A new criterion for design of brittle components and for assessing their vulnerability to brittle fracture, *Proceedings of ESREL 2011 conference, Troy, 2011*, pp.1022-1029.
86. Todinov M.T., Vulnerability of components to brittle failure initiated by flaws and its mitigation., to be presented in the ESREL 2011 conference, 2011.
87. Todinov M.T., Modelling the impact of acceleration stresses on the reliability of complex systems, *Proceedings of the ESREL 2010 Conference, Rhodos, 2010*.

88. Todinov M.T., A comparative method for Improving the Resistance of Designs to Failure Locally initiated by Flaws, ICOSAR 2009 Conference, Osaka, 2009.
89. Todinov M.T., On the limitations of the maximum expected utility principle as a basis for rational risk decisions, Proceedings of the ESREL 2009 Conference, Prague, 2009.
90. Todinov M.T., Limitations of the Weibull distribution related to predicting the probability of failure initiated by flaws, *Proceedings of ESREL 2008 & 17 SRA Europe Conference*, 2008, Valencia, Spain, 2008.
91. Todinov M.T., On the variance upper bound theorem and its applications, *Proceedings of ESREL 2008 Conference*, Valencia, Spain, 2008.
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93. Todinov M.T., An aggregated risk measure based on the cumulative distribution of the potential loss, Proceedings of the ESREL-2006, Conference, Estoril, September (2006).
94. Woods K., Todinov M.T. and J.E.Strutt, Maintenance policy selection based on reliability value analysis, Proceedings of the 3rd International ASRANet colloquium, Glasgow, July, (2006).
95. Todinov M.T., A new equation related to reliability associated with an overstress failure mechanism, 16 ARTS Conference, Loughborough, (2005).
96. Hussain A., Todinov M.T., Reliability optimisation to minimise the total losses, International conference on Reliability and Safety Engineering, December, 2005, Kharagpur, India.
97. Todinov M.T., Reliability analysis based on cost of failure, Proceedings of the ESREL-2005, Conference, Gdynia, (2005).
98. Todinov M.T., An equation and a fast algorithm for determining the probability of failure of loaded components containing flaws, Proceedings of the ICOSAR-2005 Conference, Rome, (2005).
99. Iacopino G. and Todinov M.T., Fracture of brittle components with internal flaws, Proceedings of the ICOSAR-2005 Conference, Rome, (2005).
100. Todinov M.T., MFFOP Technology for Setting Reliability Requirements, Proceedings of the Probabilistic Safety Assessment and Management Conference (PSAM7-ESREL'04), Berlin (2004).
101. Iacopino G. and Todinov M.T., Uncertainties associated with material properties and their effect on the strength distribution, International HIDA-4 Conference & Workshop, 20-22 September, (2004).
102. Todinov M.T., Setting reliability requirement based on the cost (consequences) of failure, Proceeding of the 5th IMA International Conference on Modelling in Industrial Maintenance and Reliability, Salford, 5-7 April, (2004).
103. Todinov M.T., Minimising the total losses and limiting the risk of premature failure for non-repairable components, Proceedings of the *5th International conference on Quality, Reliability and Maintenance*, Oxford, (2004).
104. Todinov M.T., On some applications of a new generic equation to reliability dependent on the relative configurations of random events in a finite time interval, Proceedings of the 15 ARTS Conference, Ed2. J.Andrews, Loughborough, (2003).
105. Todinov M.T., Reliability controlled by the relative configurations of random variables, 1st International Asranet Colloquium, Glasgow, 8-10 July 2002.

• Probabilistic modeling, Statistics and Data analysis

Journal Articles

106. Todinov M.T., Distribution mixtures from sampling inhomogeneous microstructures: variance and probability bounds of the properties, *Nuclear Engineering and Design*, **214**, (2002) 195-204.
107. Todinov M.T., Modelling consequences from failure and material properties by distribution mixtures, *Nuclear Engineering and Design*, **224**, (2003) 233-244.
108. Todinov M.T., On Coolen's comments related to statistics of defects in one-dimensional components, *Computational Materials Science*, **29** (2004) 253-258.
109. Todinov M.T., An efficient method for estimating from sparse data the parameters of the impact energy variation in the ductile-to-brittle transition region, *International journal of fracture* **111** (2001), 131-150.
110. Todinov M.T., Estimating the parameters of the impact energy variation in the ductile-brittle transition region from complete and sparse data sets, *Computational Materials Science*, **21** (2001) 111-123.
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• Modelling inhomogeneous media

Book chapters

114. Statistics of the structure and properties of inhomogeneous materials, In *Random Material Microstructures: Modelling and Mechanical Behaviour*, ed. by K.Sobczyk, Institute of Fundamental Technological Research, Polish Academy of Sciences, Warsaw, (2004), ISSN 1642-0578.

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115. Todinov M.T., Statistics of inhomogeneous media formed by nucleation and growth, *Probabilistic Engineering Mechanics*, **18** (2003) 139-149.
116. Todinov M.T., Statistics of defects in one-dimensional components, *Computational Materials Science*, **24** (2002) 430-442.
117. Todinov M.T., Distribution of properties from sampling inhomogeneous materials by line

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• Modelling the temporal and residual stresses during heat treatment of metals and alloys

Journal Articles

120. Todinov M.T., Maximum principal tensile stress and fatigue crack origin for compression springs, *International Journal of Mechanical Sciences*, **41** (1999) 357-370.
121. Todinov M.T., Residual stresses at the surface of automotive suspension springs, *Journal of Materials Science*, **35** (2000) 3313-3320.
122. Todinov M.T., Mechanism for the formation of the residual stresses from quenching, *Modelling and Simulation in Materials Science and Engineering*, **6** (1998) 273-291.
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• Modelling phase transformations and phase transformation kinetics

Journal Articles

124. Todinov M.T., On some limitations of the Johnson-Mehl-Avrami-Kolmogorov equation, *Acta Materialia*, **48** (2000) 4217-4224.
125. Todinov M.T., Alternative Approach to the problem of additivity, *Metallurgical and Materials Transactions B*, **29B** (1998) 269-273.
126. Todinov M.T., A new approach to the kinetics of a phase transformation with constant radial growth rate, *Acta materialia*, **44** (1996) 4697-4703.
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129. Todinov M.T., A general mathematical model of non-isothermal phase transformation kinetics in steels, *Conference proceedings of AMTECH'93*, Russe, May, 1993.
130. Todinov M.T., Investigating the isothermal phase transformation kinetics using computer simulations, *Conference proceedings of AMTECH'93*, Russe, May, 1993.

• Modelling processes of heat and thermochemical treatment of metals and alloys

Book chapters

131. Toshkov V., J.Nicolov, J.Kaleicheva, R.Petrov, V.Simeonov, M.Todinov, G.Baharov. *Practicum in heat treatment of metals*, Sofia, 1993.

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132. Todinov M.T., A mathematical model, numerical method and computer programme for predicting the temperature field during normalising of cylindrical details, *Proceedings of the Third youth international scientific conference*, VVTU-T.Kableshkov, Sofia, November, 1992.

133. Todinov M.T., and S.L.Bailov. Determining the cooling capability of air medium during free convection, *Proceedings of the Third youth international scientific conference*, VVTU-T.Kableshkov, Sofia, November, 1992.

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Theses

135. M.T.Todinov, *Models and algorithms for optimal cutting of one- and two-dimensional stock in the batch production*, M.Sc. thesis in Mechanical Engineering, Technical University of Sofia, 1987.

136. M.T.Todinov, *A two point boundary problem for a parabolic quasilinear partial differential equations modelling heat- and mass-transfer*, Sofia, an MSc thesis, Institute of Applied Mathematics and Computer Science, Sofia, 1989.

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138. M.T.Todinov, Novel probabilistic models in Mechanical Engineering, A higher doctorate Doctor of Engineering (DEng), *Birmingham University Library*, 2008.

Invited lectures

- Todinov M.T., On the method of stochastic pruning for analysing the performance of complex systems, invited speaker invitation for the 2017 2nd International Conference on System Reliability and Safety (Milan, December, 20-22).
- Todinov M.T., Is the average production availability a good performance measure? *Reliability and Maintenance for Subsea systems Conference*, Aberdeen, 25 April, 2007 and London, 25 May, 2007.
- Todinov M.T., Quantifying the operational risk related to production systems, Seminar, Paderborn University, Paderborn, 28th of November 2006.
- Todinov M.T., The distribution of the potential losses from failures as an alternative to the traditional risk measures, Seminar, Manchester, 5th of December, 2006.
- Todinov M.T., Potential losses from failures - an alternative measure of the operational risk, Cranfield University, 16th of June, 2006.

- Todinov M.T., Correct assessment of the potential losses from failures - an essential part of the subsea reliability strategy, Proceedings of the *Reliability and Maintenance for Subsea systems Conference*, Aberdeen, 23-24 May, 2006.
- Todinov M.T., Cost-of-failure based reliability analysis and conventional reliability analysis in the Subsea industry, Proceedings of the conference *Reliability and Maintenance for Subsea systems*, Aberdeen, 24-25 May, 2005.
- Todinov M.T., Statistics of the structure and properties of inhomogeneous materials, invited lectures, *Institute of Fundamental Technological Research, Polish Academy of Sciences*, Warsaw 2-4 February (2004).
- Todinov M.T., Uncertainty associated with material properties from multiple sources, invited lecture, Product Reliability Assurance IMechE seminar, London, 19.02.2004.
- Todinov M.T., Cost-of-failure reliability analysis in deep-water oil and gas production, Deepwater subsea systems "Working towards Improved Subsea Reliability", 24-25 November, Royal Society, London, 2004.
- Todinov M.T. MFFOP technology for setting reliability requirement in deepwater oil and gas production, SUT evening lecture, Imperial College, London, 16.09.2003.
- Strutt J., M.Todinov, Setting quantitative reliability requirements, Regularity Conference, Stavanger, Norway, 2003.
- Todinov M.T., Probabilistic approach to the determination of fatigue lives in cast aluminium alloys, invited talk in the nCode elite seminar *Statistical Methods of Fatigue*, Sheffield, 14 April, 1999.



M.T.Todinov, Oxford, 27.10.2021