

## 一、 个人基本信息

姓名：李顶河

性别：男

出生年月：1983.10

职称：教授

最高学历：博士研究生

工作单位：中国民航大学中欧航空工程师学院

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## 二、 学习和工作经历

### 1. 教育经历

2012.08-2015.01：清华大学 博士

2007.09-2009.06：中国民航大学 硕士

2003.09-2007.06：中国民航大学 学士

### 2. 工作经历

2021.01 至今：中国民航大学 教授

2015.12-2020.12：中国民航大学 副教授（破格）

2017.07-2018.07：美国哥伦比亚大学 访问副研究员

2015.03-2015.12：中国民航大学 讲师

2009.09-2012.06：中国民航大学 助教

## 三、 研究方向

聚焦于解决复合材料结构全寿命分析中的基础力学问题，研究方向紧靠民机设计制造业和运行维护业，涉及高精度板壳分析理论、多物理场多尺度分析理论、复合材料结构修理技术、结构健康监测与管理技术等

#### 四、 科研情况

##### 1. 科研项目

- 1) 民机健康监测与管理数据分析及集成技术研究 (项目批准号: 20232k0345), 民机专项 (子课题), 经费: 160.0 万元, 项目起止年月: 2023 年 1 月至 2025 年 12 月;
- 2) 客舱安全适航性设计与符合性验证技术研究 (项目批准号: 工信部重装函 [2022]284), 民机专项 (任务), 经费: 120.0 万元, 项目起止年月: 2023 年 1 月至 2024 年 12 月;
- 3) 复合材料结构热压罐固化成型工艺过程的多物理场流固完全耦合求解方法研究(项目批准号: 12072364), 面上项目, 经费: 62.0 万元, 项目起止年月: 2021 年 1 月至 2024 年 12 月;
- 4) 民用航空发动机热障涂层结构跨尺度多物理场耦合断裂机理及计算框架研究(项目批准号: U1933102), 民航联合研究基金, 经费: 38.0 万元, 项目起止年月: 2020 年 1 月至 2022 年 12 月;
- 5) 复合材料板壳结构低速冲击损伤问题的扩展逐层理论研究及其应用(项目批准号: 11502286), 国家自然科学基金青年科学基金项目, 经费: 22.8 万元, 项目起止年月: 2016 年 01 月至 2018 年 12 月;
- 6) 复合材料层合板壳结构损伤疲劳扩展问题的逐层理论研究(项目批准号: 17JCQNJC02600), 天津市自然科学基金青年基金项目, 经费: 6.0 万元, 项目起止年月: 2017 年 04 月至 2020 年 03 月;
- 7) 天津市教委科研计划项目, 经费: 10.0 万元, 弹性涂层材料冲蚀磨损数值预测方法及机理研究(项目批准号: 2018KJ241), 2018 年 10 月-2020 年 9 月, 在研, 主持;
- 8) 飞机复合材料结构智能补片的关键技术研究(项目批准号: 3122017021), 中央高校基本科研业务费 (B 类), 经费: 20.0 万元, 项目起止年月: 2017 年 01 月至 2018 年 12 月;
- 9) 功能梯度材料多场耦合断裂行为预测理论及数值方法研究, 中国民航大学省部级科研机构开放基金, 经费: 5.0 万元, 项目起止年月: 2016 年 10 月至 2018 年 9 月;
- 10) 三维纺织复合材料高速冲击问题的质点型细观结构建模与模拟(项目批准号: 11472153), 国家自然科学基金面上项目, 经费: 86 万元, 项目起止年月: 2015 年 01 月至 2018 年 12 月;
- 11) 船身式下机身典型结构抗疲劳设计技术研究 (项目批准号: 2022KF0080), 中国特种飞行器研究所委托项目, 经费: 33.0 万元, 项目起止年月: 2022 年 10 月至 2023 年 11 月;

##### 2. 学术论著

- 1) A Wan, J Shi, **D Li**. Experimental and numerical investigation on tension-tension fatigue behavior of three-dimensional five-directional hybrid braided composites. *International Journal of Fatigue*
- 2) **D Li\***, P.X. Wu, A.S. Wan. (2023) A three-scale layerwise multiscale analysis method for composite laminated plates, *Mechanics of Materials*, 185: 104769
- 3) D Wu, Z Liu, Y Li, Z Zhang. Study on constraint effect and creep crack initiation of plate containing elliptical embedded cracks, *Journal of Theoretical and Applied Mechanics*
- 4) D Wu, Y Li, Z Liu, **D Li**. The development of two multi-axial ductility factor predicting models based on creep cavity growth theory, *Journal of Theoretical and Applied Mechanics*
- 5) Z Yun, **D Li\***. (2023) Thermo-mechanical fatigue progressive analysis of delamination in composite laminates. *Mechanics of Advanced Materials and Structures*, doi.org/10.1080/15376494.2023.2193442
- 6) D Wu, **D Li**, Z Zhang, J Chen. (2023) Numerical study on compression properties of semi-reentrant filled tubular structures. *Journal of Theoretical and Applied Mechanics*, 2023; 61(2): 233-244
- 7) D Wu, Z Liu, **D Li**, Z Zhang, J Chen. (2023) Study on the stress intensity factor of a compact specimen under the pre-compressed load condition. *Journal of Theoretical and Applied Mechanics* 2023; 61(1): 37-47.
- 8) **D Li**, S Ma. (2023) Dynamic thermomechanical analysis on stiffened composite plates with damage. *Journal of Thermal Stresses*
- 9) Y Wu, H Liu, **D Li**, X Shen, P Lu. (2022) Numerical and Experimental Research on Non-Reference Damage Localization Based on the Improved Two-Arrival-Time Difference Method. *Sensors* 2022, 22(21), 8432.
- 10) **D Li\***, H Yuan, S Ma, J Yang. (2022) Dynamic Coupling Analysis on Thermo-Chemo-Mechanical Field and Fluid-Structure Interaction for Aero-Engine Turbine Blade with Functional Gradient Thermal Barrier Coatings. *Coatings*, 12(10): 1498.
- 11) A Wan, **D Li**, P Lu. (2022) Three-scale modeling and probabilistic progressive damage analysis of woven composite laminates. *Mechanics of Advanced Materials and Structures*
- 12) X Dong, Y Zheng, D Xie, **D Li**. (2023) Multi-functional mullite fiber-based porous ceramics with a multilevel pore structure assembled by alumina platelets and mullite whiskers. *Ceramics International*, 49(1): 847-854.
- 13) **D Li\***, Z Zhu. (2022) Three-dimensional decoupled modeling on curing simulation of composite laminated plates with damage. *Materials Today Communications*, 33(22): 104255
- 14) **D Li\***, F You, Y Liu, Q Guo. (2022) On oxide growth fracture analysis of thermal barrier coatings based on a three-dimensional chemo-mechanical model. *Materials Today Communications* 31, 103793
- 15) **D Li**. (2022) *Analysis of Composite Laminates: Theories and Their Applications*. Elsevier.
- 16) Z Xiao, Y Wu, **D Li\***. (2022) Thermo-electro-mechanical dynamic fracture analysis on laminated piezoelectric plates. *Composite Structures*, 285: 115158.
- 17) **D Li\***, P Wu, A Wan. (2022) A two-scale computational continua multiscale analysis model for honeycomb sandwich plates. *Mechanics of Advanced Materials and Structures*, 30(7):1-13.
- 18) **D Li\***, Z Yun, (2022) Thermo-mechanical progressive analysis on multiple delaminations in composite laminates. *Continuum Mechanics and Thermodynamics*, 34: 341-366
- 19) Y Wu, X Shen, **D Li**. (2021) Modeling, identification and optimization of damage deterioration in the bolted repaired metallic plate. *Ferroelectrics*, 583(1): 278-294.
- 20) Y Wu, Z Xiao, K Liu, **D Li\***. (2021) A three-dimensional numerical model for delaminations, transverse crack or debonding in composite sandwich plates with piezoelectric sensors. *Journal of Intelligent Material Systems and Structures*, 33(7): 883-900
- 21) **D Li\***, S Ma. (2021) Dynamic thermomechanical analysis on composite sandwich plates with damage. *Continuum Mechanics and Thermodynamics*, 33: 2167–2201

- 22) **D Li**, Z Wang, C Zhang\*. (2021) Computational continua method and multilevel-multisite mesh refinement method for multiscale analysis of woven composites laminates. *Composite Structures*, 259: 113441
- 23) W Shan, **D Li**\*. (2021) Thermo-mechanic-chemical coupling fracture analysis for thermal barrier coating based on extended layerwise method. *Surface and Coatings Technology*, 405: 126520
- 24) **D Li**\*, A Wan. (2021) A layerwise multiscale analysis method for composite laminated plates. *Composite Structures*, 257: 113157
- 25) Wu Y, Xiao Z, **D Li**\*, et al. (2020) On numerical static analysis of stiffened laminated composite plates with delaminations, cracks, or debonding of a piezoelectric patch. *Mechanics of Advanced Materials and Structures*, 29(1): 89-103.
- 26) **D Li**\*. (2020) Layerwise Theories of Laminated Composite Structures and Their Applications: A Review. *Archives of Computational Methods in Engineering*, 28: 577–600
- 27) 李顶河, 徐建新. 飞机复合材料结构修理: 理论、设计及应用. 北京: 科学出版社, 2019
- 28) **D Li**\*, W Shan. (2020) Numerical fracture analysis for chemo-mechanical coupling problems in multilayered porous media. *International Journal of Mechanical Sciences*, 172: 105412.
- 29) J Xu, Z Xiao, Y Wu, **D Li**\*. (2020) Extended layerwise method for laminated piezoelectric and composite plates with delaminations, cracks or debonding of a piezoelectric patch. *Composite Structures*, 234: 111692.
- 30) **D Li**\*, Z Wang, C Zhang. (2021) A multi-level and multi-site mesh refinement method for the 2D problems with microstructures. *Mechanics of Advanced Materials and Structures*, 28(14).
- 31) **D Li**\*, W Shan, F Zhang. (2020) Steady-state thermomechanical analysis of composite laminated plate with damage based on extended layerwise method. *Archive of Applied Mechanics*, 90: 415–435.
- 32) Wu Y, Xiao Z, **Li D**, Xu J, Shen X. (2019) Numerical and experimental study on crack identification based on the piezoelectric ceramic lead zirconate titanate impedance technology. *Journal of Intelligent Material Systems and Structures*, 30: 1706-1716.
- 33) **Li D**\*, Fish J, Yuan Z. (2018) Two-scale and three-scale computational continua models of composite curved beams. *International Journal for Multiscale Computational Engineering*, 6: 527-554.
- 34) **Li D**\*, Yang X, Qian R L, et al. (2018) Static and dynamic response analysis of functionally graded material plates with damage. *Mechanics of Advanced Materials & Structures* 1:1-14.
- 35) Lu X, Yang J Y, Xu D, **Li D**\*. (2018) Extended Layerwise/Solid-Element method of composite sandwich plates with damage. *Mechanics of Advanced Materials & Structures*, 26 (16), 1376-1389.
- 36) **Li D**\*, Fish J. (2018) Thermomechanical Extended Layerwise Method for laminated composite plates with multiple delaminations and transverse cracks. *Composite Structures*. 185: 665-683.
- 37) Xu J X, Zhang F, **Li D**\*. (2017) Accuracy improvement of XFEM using Wilson's incompatible element technique. *Mechanics of Advanced Materials & Structures*, 26 (5), 443-450.
- 38) **Li D**\*, Guo Q, Xu D, Yang X. (2017) Three-dimensional micromechanical analysis models of fiber reinforced composite plates with damage. *Computers & Structures* 191, 100-114.
- 39) **Li D**\*, Zhang F. (2017) Full extended layerwise method for the simulation of laminated composite plates and shells. *Computers & Structures* 187, 101-113.
- 40) Lu X, Yang JY, Wu YG, Zhang F, **Li D**\*. (2017) An extended layerwise/solid-element method of stiffened composite plates with delaminations and transverse crack. *International Journal of Mechanics and Materials in Design*, 1-14.
- 41) **Li D**\*. (2017) Three-dimensional analysis of transverse crack fiber bridging in laminated composite plates. *Composite Structures*. 164(15): 277-290.
- 42) **Li D**\*. (2016) Extended Layerwise method of laminated composite shells. *Composite Structures*, 136: 313-344.

- 43) **Li D.\***. (2016) Delamination and transverse crack growth prediction for laminated composite plates and shells. *Computers & Structures*, 177:39-55.
- 44) **Li D.**, Zhang X.\*, Sze K., Liu Y.. (2016) Extended Layerwise method for laminated composite plates with multiple delaminations and matrix cracks. *Computational Mechanics*. 58(4): 657–679.
- 45) **Li D.\***, Zhang F., Xu J.. (2016) Incompatible extended layerwise method for laminated composite shells. *International Journal of Mechanical Sciences*, 119: 243-252.
- 46) **Li D.\***, Wang R., Qian R., Liu Y., Qing G.. (2016) Static response and free vibration analysis of the composite sandwich structures with multi-layer cores. *International Journal of Mechanical Sciences*, 111-112: 101-115.
- 47) **Li D.**, Liu Y., Zhang X.\* (2015). An extended Layerwise method for composite laminated beams with multiple delaminations and matrix cracks. *International Journal for Numerical Methods in Engineering*, 101(6): 407-434.
- 48) **Li D.**, Liu Y., Zhang X.\* (2014). Low-velocity impact responses of the stiffened composite laminated plates based on the progressive failure model and the layerwise/solid-elements method. *Composite Structures*, 110: 249-275.
- 49) **Li D.\***, Qing G. (2014). Free vibration analysis of composite laminates with delamination based on state space theory. *Mechanics of Advanced Materials and Structures*, 21: 402-411.
- 50) **Li D.**, Liu Y., Zhang X.\* (2013). A layerwise/solid-element method of the linear static and free vibration analysis for the composite sandwich plates. *Composites: Part B Engineering*, 252: 187-198.
- 51) **Li D.**, Liu Y., Zhang X.\* (2013). Linear statics and free vibration sensitivity analysis of the composite sandwich plates based on a layerwise/solid-element method. *Composite Structures*, 106: 175-200.
- 52) **Li D.\***, Qing G., Liu Y. (2013). A layerwise/solid-element method for the composite stiffened laminated cylindrical shell structures. *Composite Structures*, 98: 215-227.
- 53) **Li D.\***, and Qing G. (2013). Sensitivity analysis of composite laminated plates using the meshless in the state space framework. *International Journal Computational Methods*, 10(5): 1350023-1-26.
- 54) **Li D.\***, Liu Y. (2012). Three-dimensional semi-analytical model for the static response and sensitivity analysis of the composite stiffened laminated plate with interfacial imperfections. *Composite Structures*, 94(6): 1943-1958.
- 55) **Li D.\***, Xu J., Qing G. (2011). Free vibration analysis and eigenvalues sensitivity analysis for the composite laminates with interfacial imperfection. *Composite, Part: B Engineering*, 42: 1588-1595.
- 56) **Li D.\***, Qing G., Liu Y. (2011). A three-dimensional semi-analytical model for the composite laminated plates with a stepped lap repair. *Composite Structures*, 93: 1673-1682.
- 57) **Li D.\***, Xu J., Qing G. (2010). Sensitivity analysis of composite laminated plates with bonding imperfection in Hamilton system. *Appl. Math. Mech. -Engl. Ed.* 31(12): 1549-1560.
- 58) G. Qing, Y. Liu, **D. Li**. (2011) A semi-analytical model for the energy release rate analyses of composite laminates with a delamination. *Finite Elements in Analysis and Design*, 47(9): 1017-1024.
- 59) Y. Liu, Y. Shi, **D. Li**. (2011) B-Spline Wavelet on the Interval Element for the Solution of Hamilton Canonical Equation. *Mechanics of Advanced Materials and Structures*, 18(6): 446-453.
- 60) **Li D.\*** (2012). Delamination buckling for composite laminated cylindrical shells in Hamilton system. *The IES Journal Part A: Civil & Structural Engineering*, 5(4): 222-230.

### 3. 授权专利

- 1) 吴品鑫；李顶河；一种环保复合材料加工系统，2022-11-22，中国，ZL202111500171.7
- 2) 许凯宁；李顶河；万傲霜；基于视觉检测的飞机部件缺陷在线识别系统，2023-

7-14, 中国, CN202310695760.8

#### 4. 科研获奖

- 1) 李顶河(1/15); 民用飞机复合材料结构修理的分析理论与优化设计方法及应用, 中国航空运输协会, 科技进步, 省部一等奖, 2024
- 2) 李顶河(6/6); 基于实车复杂工况的钢、铝材料腐蚀损伤评价关键技术研究及应用, 中国发明协会, 科技进步, 省部二等奖, 2022

#### 5. 学术兼职

- 1) 商用航空发动运维技术开发联合实验室主任
- 2) 全国专业标准化技术委员会浮空器分技术委员会委员
- 3) 《航空科学技术》、《应用力学学报》、《中国民航大学学报》青年编委
- 4) 中国航空教育学会国际化人才培养分会委员
- 5) 卓越航空工程师培养系列教材专家委员会主任委员
- 6) 民用飞机维修工程系列教材专家委员会副主任委员

### 五、 其他