

BIBLIOGRAPHY

- Abbas, I. A. (2015). Analytical solution for a free vibration of a thermoelastic hollow sphere. *Mechanics Based Design of Structures and Machines*, 43(3):265–276.
- Abbas, I. A. (2018). Free vibrations of nanoscale beam under two-temperature Green and Naghdi model. *International Journal of Accoustic Vibration*, 23(3):289–293.
- Abbas, I. A. and Abo-el nour, N. (2008). Effects of thermal relaxations on thermoelastic interactions in an infinite orthotropic elastic medium with a cylindrical cavity. *Archive of Applied Mechanics*, 78(4):283–293.
- Abbas, I. A. and Othman, M. I. A. (2009). Effect of rotation on thermoelastic waves with Green-Naghdi theory in a homogeneous isotropic hollow cylinder. *International Journal of Industrial Mathematics*, 1(2):121–134.
- Abd-alla, A.-e.-n. N., Alshaikh, F., Del Vescovo, D., and Spagnuolo, M. (2017). Plane waves and eigenfrequency study in a transversely isotropic magneto-thermoelastic medium under the effect of a constant angular velocity. *Journal of Thermal Stresses*, 40(9):1079–1092.
- Abouelregal, A. (2020). On Green–Naghdi thermoelasticity model without energy dissipation with higher order time differential and phase-lags. *Journal of Applied and Computational Mechanics*, 6(3):445–456.
- Abouelregal, A. E. (2011). Generalized thermoelasticity for an isotropic solid sphere in Dual-phase-lag of heat transfer with surface heat flux. *International Journal for Computational Methods in Engineering Science and Mechanics*, 12(2):96–105.
- Abouelregal, A. E. and Abo-Dahab, S. M. (2015). Study of the dual phase lag model of thermoelasticity for a half-space problem with rigidly fixed surface in the presence of a thermal shock. *Journal of Computational and Theoretical Nanoscience*, 12(1):38–45.
- Abouelregal, A. E., Ahmed, I.-E., Nasr, M. E., Khalil, K. M., Zakria, A., and Mohammed, F. A. (2020). Thermoelastic processes by a continuous heat source line in an infinite solid via Moore–Gibson–Thompson thermoelasticity. *Materials*, 13(19):4463.
- Abouelregal, A. E. and Sedighi, H. M. (2021). A new insight into the interaction of thermoelasticity with mass diffusion for a half-space in the context of Moore–Gibson–

- Thompson thermodiffusion theory. *Applied Physics A*, 127(8):582.
- Agarwal, V. K. (1978). On surface waves in generalized thermoelasticity. *Journal of Elasticity*, 8(2):171–177.
- Agarwal, V. K. (1979). On plane waves in generalized thermoelasticity. *Acta Mechanica*, 31(3-4):185–198.
- Ahmadikia, H., Fazlali, R., and Moradi, A. (2012). Analytical solution of the parabolic and hyperbolic heat transfer equations with constant and transient heat flux conditions on skin tissue. *International communications in heat and mass transfer*, 39(1):121–130.
- Ailawalia, P., Kumar, S., and Pathania, D. S. (2016). Internal heat source in thermoelastic microelongated solid under Green Lindsay theory. *Journal of Theoretical and Applied Mechanics*, 46(2):65.
- Al-Huniti, N. S. and Al-Nimr, M. A. (2005). Dynamic thermoelastic response of a heated thin composite plate using the dual-phase-lag heat conduction model. *Heat transfer engineering*, 26(9):41–49.
- Alzahrani, F., Hobiny, A., Abbas, I., and Marin, M. (2020). An eigenvalues approach for a two-dimensional porous medium based upon weak, normal and strong thermal conductivities. *Symmetry*, 12(5):848.
- Antaki, P. J. (1998a). Importance of non Fourier heat conduction in solid-phase reactions. *Combustion and Flame*, 112(3):329–341.
- Antaki, P. J. (1998b). Solution for non-Fourier dual phase lag heat conduction in a semiinfinite slab with surface heat flux. *International Journal of Heat and Mass Transfer*, 41(14):2253–2258.
- Anwar, M. N. and Sherief, H. H. (1988a). Boundary integral equation formulation of generalized thermoelasticity in a Laplace-transform domain. *Applied mathematical modelling*, 12(2):161–166.
- Anwar, M. N. and Sherief, H. H. (1988b). State space approach to generalized thermoelasticity. *Journal of Thermal Stresses*, 11(4):353–365.
- Anwar, M. N. and Sherief, H. H. (1994). Boundary integral equation formulation for thermoelasticity with two relaxation times. *Journal of thermal stresses*, 17(2):257–270.
- Aouadi, M., Campo, M., Copetti, M. I. M., and Fernández, J. R. (2019). Analysis of a multidimensional thermoviscoelastic contact problem under the Green–Lindsay theory. *Journal of Computational and Applied Mathematics*, 345:224–246.
- Aouadi, M. and Moulahi, T. (2015). Optimal decay rate for unidimensional ther-

- moelastic problem within the Green-Lindsay model. *Journal of Thermal Stresses*, 38(10):1199–1216.
- Askarizadeh, H. and Ahmadikia, H. (2014). Analytical analysis of the dual-phase-lag model of bioheat transfer equation during transient heating of skin tissue. *Heat and Mass Transfer*, 50:1673–1684.
- Askarizadeh, H. and Ahmadikia, H. (2015). Analytical study on the transient heating of a two-dimensional skin tissue using parabolic and hyperbolic bioheat transfer equations. *Applied Mathematical Modelling*, 39(13):3704–3720.
- Atkins, K. R. and Osborne, D. V. (1950). The velocity of second sound below 1K. *The London, Edinburgh, and Dublin Philosophical Magazine and Journal of Science*, 41(321):1078–1081.
- Bagri, A. and Eslami, M. R. (2007a). Analysis of thermoelastic waves in functionally graded hollow spheres based on the Green-Lindsay theory. *Journal of Thermal Stresses*, 30(12):1175–1193.
- Bagri, A. and Eslami, M. R. (2007b). A unified generalized thermoelasticity formulation; application to thick functionally graded cylinders. *Journal of thermal stresses*, 30(9-10):911–930.
- Bahar, L. Y. and Hetnarski, R. B. (1978). State space approach to thermoelasticity. *Journal of Thermal Stresses*, 1(1):135–145.
- Bahar, L. Y. and Hetnarski, R. B. (1979). Direct approach to thermoelasticity. *Journal of Thermal Stresses*, 2(1):135–147.
- Banerjee, S. and Roychoudhuri, S. K. (1995). Spherically symmetric thermo-visco-elastic waves in a visco-elastic medium with a spherical cavity. *Computer Mathematics with Application*, 30(1):91–98.
- Baumeister, K. J. and Hamill, T. D. (1969). Hyperbolic heat-conduction equation - a solution for the semi-infinite body problem. *J. Heat Transfer*, 91(4):543–548.
- Bazarrá, N., Fernández, J. R., and Quintanilla, R. (2021a). Analysis of a Moore–Gibson–Thompson thermoelastic problem. *Journal of Computational and Applied Mathematics*, 382(15):113058.
- Bazarrá, N., Fernández, J. R., and Quintanilla, R. (2021b). On the decay of the energy for radial solutions in Moore–Gibson–Thompson thermoelasticity. *Mathematics and Mechanics of Solids*, 26:1507–1514.
- Bellman, R., Kalaba, R. E., and Lockett, J. A. (1966). *Numerical inversion of the Laplace transform*. American Elsevier New York.
- Biot, M. A. (1956). Thermoelasticity and irreversible thermodynamics. *Journal of*

- Applied Physics*, 27(3):240–253.
- Boley, B. and Weiner, J. H. (1960). *Theory of thermal stresses*. John Wiley and Sons, New York.
- Boschi, E. and Ieşan, D. (1973). A generalized theory of linear micropolar thermoelasticity. *Meccanica*, 8:154–157.
- Brebbia, C. A. (1980). *The boundary element method for engineers*. Pentech press, Xi'an, China.
- Brebbia, C. A. and Walker, S. (2016). *Boundary element techniques in engineering*. Elsevier.
- Carlson, D. E. (1973). Linear thermoelasticity. In C. Truesdell, editor, *Handbuch der Physik*, volume VIa/2, pages 297–345. Springer, Berlin-Heidelberg-New York.
- Cattaneo, C. (1948). On the conduction of heat. *Atti Sem. Mat. Fis. Universita Modena*, 3(1):83–101.
- Cattaneo, C. (1958). A form of heat-conduction equations which eliminates the paradox of instantaneous propagation. *Comptes Rendus*, 247:431–433.
- Chadwick, P. (1960). *Progress in solid mechanics*, volume I. North Holland Publishing Co.
- Chan, S. H., Low, M. J. D., and Mueller, W. K. (1971). Hyperbolic heat conduction in catalytic supported crystallites. *AIChE Journal*, 17(6):1499–1501.
- Chand, D., Sharma, J. N., and Sud, S. P. (1990). Transient generalised magnetothermoelastic waves in a rotating half-space. *International journal of engineering science*, 28(6):547–556.
- Chandrasekharaiah, D. (1988). A generalized linear thermoelasticity theory for piezoelectric media. *Acta Mechanica*, 71(1-4):39–49.
- Chandrasekharaiah, D. S. (1980). On generalised thermoelastic wave propagation. In *Proceedings of the Indian Academy of Sciences-Mathematical Sciences*, volume 89, pages 43–52. Springer.
- Chandrasekharaiah, D. S. (1986). Thermoelasticity with second sound: a review. *Applied Mechanics Reviews*, 39(3):355–376.
- Chandrasekharaiah, D. S. (1996a). A note on the uniqueness of solution in the linear theory of thermoelasticity without energy dissipation. *Journal of Elasticity*, 43:279–283.
- Chandrasekharaiah, D. S. (1996b). One-dimensional wave propagation in the linear theory of thermoelasticity without energy dissipation. *Journal of Thermal Stresses*, 19:695–710.

- Chandrasekharaiah, D. S. (1996c). A uniqueness theorem in the theory of thermoelasticity without energy dissipation. *Journal of Thermal Stresses*, 19(3):267–272.
- Chandrasekharaiah, D. S. (1998). Hyperbolic thermoelasticity: a review of recent literature. *Appl. Mech. Rev.*, 51(12):705–729.
- Chandrasekharaiah, D. S. and Keshavan, H. R. (1992). Axisymmetric thermoelastic interactions in an unbounded body with cylindrical cavity. *Acta Mechanica*, 92(1-4):61–76.
- Chandrasekharaiah, D. S. and Murphy, H. N. (1994). On a mixed problem for the temperature equation in generalized thermoelasticity. *Acta Mechanica*, 104:105–114.
- Chandrasekharaiah, D. S. and Murthy, H. N. (1991). Temperature-rate-dependent thermoelastic interactions due to a line heat source. *Acta Mechanica*, 89(1-4):1–12.
- Chandrasekharaiah, D. S. and Srikantaiah, K. R. (1983). Some theorems in temperature-rate-dependent theory of thermoelasticity. *Proceedings Mathematical Sciences*, 92:135–141.
- Chandrasekharaiah, D. S. and Srikantiah, K. R. (1984). Thermoelastic plane waves in a rotating solid. *Acta Mechanica*, 50(3-4):211–219.
- Chandrasekharaiah, D. S. and Srikantiah, K. R. (1987). On temperature-rate dependent thermoelastic interactions in an infinite solid due to a point heat-source. *Indian Journal of Technology*, 25(1):1–7.
- Chandrasekharaiah, D. S. and Srinath, K. S. (1997a). Axisymmetric thermoelastic interactions without energy dissipation in an unbounded body with cylindrical cavity. *Journal of Elasticity*, 46(1):19–31.
- Chandrasekharaiah, D. S. and Srinath, K. S. (1997b). Thermoelastic plane waves without energy dissipation in a half-space due to time-dependent heating of the boundary. *Journal of Thermal Stresses*, 20(6):659–676.
- Chandrasekharaiah, D. S. and Srinath, K. S. (1997c). Thermoelastic plane waves without energy dissipation in a rotating body. *Mechanics Research Communications*, 24:551–560.
- Chandrasekharaiah, D. S. and Srinath, K. S. (1998). Thermoelastic interactions without energy dissipation due to a line heat source. *Acta Mechanica*, 128(3):243–251.
- Chandrasekharaiah, D. S. and Srinath, K. S. (2000). Thermoelastic waves without energy dissipation in an unbounded body with a spherical cavity. *International Journal of Mathematics and Mathematical Sciences*, 23(8):555–562.
- Chandrasekharaiah, D. S. and Srikantiah, K. R. (1986). Temperature-rate dependent thermoelastic waves in a half space. *Indian Journal of Technology*, 24(0):66–70.

- Chatterjee, G. and Roychoudhuri, S. K. (1990). On spherically symmetric temperature-rate dependent thermoelastic wave propagation. *J. Math. Phys. Sci*, 24:251–264.
- Chattopadhyay, A., Pal, A. K., and Kushwaha, V. (1982). Stresses produced in an initially stressed elastic half-space due to a moving load. *Indian Journal of Pure and Applied Mathematics*, 13(5):581–585.
- Chen, J. and Dargush, G. F. (1995). Boundary element method for dynamic poroelastic and thermoelastic analyses. *International Journal of Solids and Structures*, 32(15):2257–2278.
- Chen, T.-C. and Weng, C.-I. (1988). Generalized coupled transient thermoelastic plane problems by laplace transform/finite element method. *Journal of Applied Mechanics*, 55(2):377–382.
- Chester, M. (1963). Second sound in solids. *Physical Review*, 131(5):2013.
- Chirilă, A., Marin, M., and Montanaro, A. (2022). Well-posedness for thermo-electro-viscoelasticity of Green–Naghdi type. *Continuum Mechanics and Thermodynamics*, pages 1–22.
- Chirita, S. and Ciarletta, M. (2010). Reciprocal and variational principles in linear thermoelasticity without energy dissipation. *Mechanics Research Communications*, 37(3):271–275.
- Chyr, I. A. and Shynkarenko, H. A. (2017). Well-posedness of the Green–Lindsay variational problem of dynamic thermoelasticity. *Journal of Mathematical Sciences*, 226:11–27.
- Ciarletta, M. (1999). A theory of micropolar thermoelasticity without energy dissipation. *Journal of Thermal Stresses*, 22(6):581–594.
- Conti, M., Pata, V., and Quintanilla, R. (2020). Thermoelasticity of Moore–Gibson–Thompson type with history dependence in the temperature. *Asymptotic Analysis*, 120(1-2):1–21.
- Cruse, T. A. (1969). Numerical solutions in three dimensional elastostatics. *International journal of solids and structures*, 5(12):1259–1274.
- Cruse, T. A. (1973). Application of the boundary-integral equation method to three dimensional stress analysis. *Computers and Structures*, 3(3):509–527.
- Das, K., Singh, R., and Mishra, S. C. (2013). Numerical analysis for determination of the presence of a tumor and estimation of its size and location in a tissue. *Journal of Thermal Biology*, 38(1):32–40.
- Davydov, E. V., Lubashevsky, I. A., Milyaev, V. A., and Musin, R. F. (2001). Non-diffusive heat transfer in muscle tissue. preliminary results. *arXiv preprint cond-*

mat/0102006, 1(1).

- Dell’Oro, F., Lasiecka, I., and Pata, V. (2016). The Moore–Gibson–Thompson equation with memory in the critical case. *Journal of Differential Equations*, 261(7):4188–4222.
- Dell’Oro, F. and Pata, V. (2017). On the Moore–Gibson–Thompson equation and its relation to linear viscoelasticity. *Applied Mathematics and Optimization*, 76(3):641–655.
- Dhaliwal, R. S., Majumdar, S. R., and Wang, J. (1997). Thermoelastic waves in an infinite solid caused by a line heat source. *International Journal of Mathematics and Mathematical Sciences*, 20(2):323–334.
- Dhaliwal, R. S. and Rokne, J. G. (1989). One-dimensional thermal shock problem with two relaxation times. *Journal of Thermal Stresses*, 12(2):259–279.
- Dhaliwal, R. S. and Sherief, H. H. (1980). Generalized thermoelasticity for anisotropic media. *Quarterly of Applied Mathematics*, 38(1):1–8.
- Dhaliwal, R. S. and Singh, A. (1980). *Dynamic coupled thermoelasticity*. Hindustan Publishing Corporation, New Delhi, India.
- Dirac, P. A. M. (1927). The physical interpretation of the quantum dynamics. *Proceedings of the Royal Society of London. Series A, Containing Papers of a Mathematical and Physical Character*, 113(765):621–641.
- Duhamel, J. M. C. (1837). Second memoire sur les phenomenes thermo-mecaniques. *Journal de lâÉcole polytechnique*, 15(25):1–57.
- Dutta, J. and Kundu, B. (2018). Thermal wave propagation in blood perfused tissues under hyperthermia treatment for unique oscillatory heat flux at skin surface and appropriate initial condition. *Heat and Mass Transfer*, 54:3199–3217.
- El-Attar, S. I., Hendy, M. H., and Ezzat, M. A. (2019). On phase-lag Green–Naghdi theory without energy dissipation for electro-thermoelasticity including heat sources. *Mechanics Based Design of Structures and Machines*, 47(6):769–786.
- El-Karamany, A. S. and Ezzat, M. A. (2004). Boundary integral equation formulation for the generalized thermoviscoelasticity with two relaxation times. *Applied mathematics and computation*, 151(2):347–362.
- El-Karamany, A. S. and Ezzat, M. A. (2011). Convolutional variational principle, reciprocal and uniqueness theorems in linear fractional two-temperature thermoelasticity. *Journal of Thermal Stresses*, 34(3):264–284.
- El-Maghraby, N. M. (2005). A two-dimensional problem for a thick plate with heat sources in generalized thermoelasticity. *Journal of Thermal Stresses*, 28(12):1227–1241.

- Elhagary, M. A. (2019). Boundary integral equation formulation for the generalized thermoviscoelasticity with one relaxation time. *Engineering Analysis with Boundary Elements*, 104:209–214.
- Erbay, S. and Suhubi, E. S. (1986). Longitudinal wave propagation in a generalized thermoelastic cylinder. *Journal of Thermal Stresses*, 9(3):279–295.
- Ezzat, M. A. (1995). Fundamental solution in thermoelasticity with two relaxation times for cylindrical regions. *International journal of engineering science*, 33(14):2011–2020.
- Ezzat, M. A. and El-Bary, A. A. (2017). Application of fractional order theory of magneto-thermoelasticity to an infinite perfect conducting body with a cylindrical cavity. *Microsystem Technologies*, 23:2447–2458.
- Ezzat, M. A. and El-Karamany, A. S. (2002). The uniqueness and reciprocity theorems for generalized thermoviscoelasticity for anisotropic media. *Journal of thermal stresses*, 25(6):507–522.
- Fazlali, R. and Ahmadikia, H. (2013). Analytical solution of thermal wave models on skin tissue under arbitrary periodic boundary conditions. *International Journal of Thermophysics*, 34:139–159.
- Fenner, R. T. (1982). Boundary element for stress problems. In *Seminar on finite elements or boundary elements, organized by the institution of mechanical engineers*.
- Feucht, B. L. (1950). The relationship between deep tissue temperature and blood flow during electromagnetic irradiation. *Archives of Physical Medicine*, 31:19–25.
- Filopoulos, S. P., Papathanasiou, T. K., Markolefas, S. I., and Tsamasphyros, G. J. (2014). Generalized thermoelastic models for linear elastic materials with microstructure part i: Enhanced Green–Lindsay model. *Journal of Thermal Stresses*, 37(5):624–641.
- Fox, N. (1969). Generalised thermoelasticity. *International Journal of Engineering Science*, 7(4):437–445.
- Francis, P. H. (1972). Thermo-mechanical effects in elastic wave propagation: a survey. *J. Sound Vib.*, 21(2):181–192.
- Furukawa, T., Noda, N., and Ashida, F. (1989). Generalized thermoelasticity for an infinite body with a circular cylindrical hole based on the Green and Lindsay’s theory. *Transactions of the Japan Society of Mechanical Engineers, Series A*, 55(517):1998–2001.
- Furukawa, T., Noda, N., and Ashida, F. (1990). Generalized thermoelasticity for an infinite body with a circular cylindrical hole. *JSME international journal. Ser. 1*,

- Solid mechanics, strength of materials*, 33(1):26–32.
- Ghazanfarian, J. and Abbassi, A. (2009). Effect of boundary phonon scattering on dual-phase-lag model to simulate micro-and nano-scale heat conduction. *International journal of heat and mass transfer*, 52(15-16):3706–3711.
- Green, A. E. and Laws, N. (1972). On the entropy production inequality. *Archive for Rational Mechanics and Analysis*, 45(1):47–53.
- Green, A. E. and Lindsay, K. A. (1972). Thermoelasticity. *Journal of Elasticity*, 2(1):1–7.
- Green, A. E. and Naghdi, P. M. (1991a). A re-examination of the basic postulates of thermomechanics. In *Proceedings of the Royal Society of London. Series A: Mathematical and Physical Sciences*, volume 432, pages 171–194. The Royal Society.
- Green, A. E. and Naghdi, P. M. (1991b). A re-examination of the basic postulates of thermomechanics. *Proceedings of the Royal Society of London. Series A: Mathematical and Physical Sciences*, 432(1885):171–194.
- Green, A. E. and Naghdi, P. M. (1992). On undamped heat waves in an elastic solid. *Journal of Thermal Stresses*, 15(2):253–264.
- Green, A. E. and Naghdi, P. M. (1993). Thermoelasticity without energy dissipation. *Journal of Elasticity*, 31(3):189–208.
- Guo, Y., Xiong, C., and Zhu, H. (2019). Dynamic response of coupled thermo-hydro-elastodynamic problem for saturated foundation under GL generalized thermoelasticity. *Journal of Porous Media*, 22(13).
- Gupta, M. (2021). *Mathematical Aspects of Some Nonconventional thermoelastic models*. PhD thesis, Indian institute of technology (BHU), Varanasi, India.
- Gupta, M. and Mukhopadhyay, S. (2019). Galerkin-type solution for the theory of strain and temperature rate-dependent thermoelasticity. *Acta Mechanica*, 230(10):3633–3643.
- Gupta, M. and Mukhopadhyay, S. (2021). Analysis of harmonic plane wave propagation predicted by strain and temperature-rate-dependent thermoelastic model. *Waves in Random and Complex Media*, 31(6):2481–2498.
- Hendy, M. H., El-Attar, S. I., and Ezzat, M. A. (2021). Two-temperature fractional Green–Naghdi of type III in magneto-thermo-viscoelasticity theory subjected to a moving heat source. *Indian Journal of Physics*, 95:657–671.
- Hetnarski, R. B. and Eslami, M. R. (2009). *Thermal Stresses: advanced theory and applications.*, volume 4. Springer, New York.
- Hetnarski, R. B. and Ignaczak, J. (1993). Generalized thermoelasticity: closed-form

- solutions. *Journal of Thermal Stresses*, 16(4):473–498.
- Hetnarski, R. B. and Ignaczak, J. (1999). Generalized thermoelasticity. *Journal of Thermal Stresses*, 22(4-5):451–476.
- Hetnarski, R. B. and Ignaczak, J. (2016). *The mathematical theory of elasticity*. CRC Press, Boca Raton, FL, USA.
- Hobiny, A. D. and Abbas, I. A. (2018). Theoretical analysis of thermal damages in skin tissue induced by intense moving heat source. *International Journal of Heat and Mass Transfer*, 124:1011–1014.
- Horgan, C. O. and Quintanilla, R. (2005). Spatial behaviour of solutions of the dual-phase-lag heat equation. *Mathematical methods in the applied sciences*, 28(1):43–57.
- Hsu, Y. Y. (1962). On the size range of active nucleation cavities on a heating surface. 84(3):207–213.
- Ieşan, D. (1966). Principes variationnels dans la theorie de la thermoelasticite couplee. *Ann, Sci. Univ. Al. I. Cuza Iasi. Mathematica*, 12:439–456.
- Iesan, D. (1967). Sur la théorie de la thermoélasticité micropolaire couplée. *Comptes Rendus Hebdomadaires Des Seances De L Acaemie Des Sciences Serie A*, 265A(9):271–275.
- Ieşan, D. (1974). On some reciprocity theorems and variational theorems in linear dynamic theories of continuum mechanics. *Mem. del. Accad. Sci. Torino. Cl. Sci. Fis. Mat. Nat. Ser.*, 4:17–37.
- Ieşan, D. (1998). On the theory of thermoelasticity without energy dissipation. *Journal of thermal stresses*, 21(3-4):295–307.
- Ignaczak, J. (1978). Domain of influence theorem in linear thermoelasticity. *International Journal of Engineering Science*, 16(2):139–145.
- Ignaczak, J. (1979). Uniqueness in generalized thermoelasticity. *Journal of Thermal Stresses*, 2(2):171–175.
- Ignaczak, J. (1985). A strong discontinuity wave in thermoelasticity with relaxation times. *Journal of Thermal Stresses*, 8(1):25–40.
- Ignaczak, J. (1991). Domain of influence results in generalized thermoelasticity-a survey. *Applied Mechanics Reviews*, 44(9):375–382.
- Ignaczak, J. and Mrówka Matejewska, E. b. (1990). One-dimensional Green's function in temperature-rate dependent thermoelasticity. *Journal of Thermal Stresses*, 13(3):281–296.
- Ignaczak, J. and Ostoja-Starzewski, M. (2010). *Thermoelasticity with finite wave speeds*. Oxford University Press.

- Ionescu-Cazimir, V. (1964). Problem of linear thermoelasticity. uniqueness theorems (i),(ii). *Bulletin of the Polish Academy of Sciences Technical Sciences*, 12:12.
- Jackson, H. E. and Walker, C. T. (1971). Thermal conductivity, second sound, and phonon-phonon interactions in NaF. *Physical Review. B*, 3(4):1428.
- Jackson, H. E., Walker, C. T., and McNelly, T. F. (1970). Second sound in NaF. *Phys. Rev. Lett.*, 25(1):26.
- Jangid, K. and Mukhopadhyay, S. (2020). Variational and reciprocal principles on the temperature-rate dependent two-temperature thermoelasticity theory. *Journal of Thermal Stresses*, 43(7):816–828.
- Jangid, K. and Mukhopadhyay, S. (2021). A domain of influence theorem for a natural stress–heat-flux problem in the Moore–Gibson–Thompson thermoelasticity theory. *Acta Mechanica*, 232(1):177–187.
- Jaswon, M. A. (1963). Integral equation methods in potential theory. *Proceedings of the Royal Society of London. Series A. Mathematical and Physical Sciences*, 275(1360):23–32.
- Jaswon, M. A. (1977). Integral equation methods in potential theory and elastostatics. *Journal of applied mechanics*, 45(4):966.
- Jeffreys, H. (1930). The thermodynamics of an elastic solid. In *Mathematical Proceedings of the Cambridge Philosophical Society*, volume 26, pages 101–106. Cambridge University Press.
- Joseph, D. D. and Preziosi, L. (1989a). Heat waves. *Reviews of modern physics*, 61(1):41.
- Joseph, D. D. and Preziosi, L. (1989b). Heat waves. *Reviews of modern physics*, 61(1):41 – 73.
- Kalkal, K. K., Kumar, S., and Kadian, A. (2022). Plane wave propagation in a fiber-reinforced thermoelastic rotating medium with variable thermal conductivity under modified Green–Lindsay model. *Waves in Random and Complex Media*, pages 1–21.
- Kaltenbacher, B., Lasiecka, I., and Marchand, R. (2011). Wellposedness and exponential decay rates for the Moore-Gibson-Thompson equation arising in high intensity ultrasound. *Control and Cybernetics*, 40:971–988.
- Kaminski, W. (1990). Hyperbolic heat conduction equation for materials with a non-homogeneous inner structure. *J. Heat Transfer*.
- Kant, S. (2018). *Study on non-Fourier heat conduction models for coupled thermo-mechanical problems*. PhD thesis, Indian institute of technology (BHU), Varanasi, India.

- Kolyano, Y. M. and Semerak, F. (1973). Solution of the dynamic problem of thermoelasticity for a circular plate, taking into account the finite velocity of propagation of heat. *Strength of Materials*, 5:234–240.
- Kothari, S. (2013). *Some aspects of generalized thermoelasticity and thermoelastic diffusion*. PhD thesis, Indian institute of technology (BHU), Varanasi, India.
- Kothari, S. and Mukhopadhyay, S. (2013). Some theorems in linear thermoelasticity with dual phase-lags for an anisotropic medium. *Journal of Thermal Stresses*, 36(10):985–1000.
- Kumar, A. (2018). *Modeling on coupled thermo-mechanics for homogeneous and non-homogenous elastic medium*. PhD thesis, Indian institute of technology (BHU), Varanasi, India.
- Kumar, A., Kant, S., and Mukhopadhyay, S. (2017). An in-depth investigation on plane harmonic waves under two-temperature thermoelasticity with two relaxation parameters. *Mathematics and Mechanics of Solids*, 22(2):191–209.
- Kumar, D. and Rai, K. N. (2016). A study on thermal damage during hyperthermia treatment based on DPL model for multilayer tissues using finite element legendre wavelet galerkin approach. *Journal of Thermal Biology*, 62:170–180.
- Kumar, D., Singh, S., and Rai, K. N. (2016). Analysis of classical Fourier, SPL and DPL heat transfer model in biological tissues in presence of metabolic and external heat source. *Heat and Mass Transfer*, 52(6):1089–1107.
- Kumar, H. (2022). *Thermoelastic damping analysis in micro and nanomechanical systems under generalized thermoelasticity and non classical continuum theories*. PhD thesis, Indian institute of technology (BHU), Varanasi, India.
- Kumar, H. and Mukhopadhyay, S. (2020). Thermoelastic damping analysis in microbeam resonators based on Moore–Gibson–Thompson generalized thermoelasticity theory. *Acta Mechanica*, 231:3003–3015.
- Kumar, H. and Mukhopadhyay, S. (2023). Size-dependent thermoelastic damping analysis in nanobeam resonators based on eringen’s nonlocal elasticity and modified couple stress theories. *Journal of Vibration and Control*, 29(7-8):1510–1523.
- Kumar, R. (2010). *Study of some problems under generalized thermoelasticity and thermoelasticity with two temperatures*. PhD thesis, Institute of Technology (BHU), Varanasi, India.
- Kumari, B. (2017). *Investigation on Some Recent Non-Fourier Heat Conduction Models for Coupled Dynamical Thermo-mechanical Problems*. PhD thesis, Indian institute of technology (BHU), Varanasi, India.

- Kumari, B. and Mukhopadhyay, S. (2017). Some theorems on linear theory of thermoelasticity for an anisotropic medium under an exact heat conduction model with a delay. *Math. Mech. Solids*, 22(5):1177–1189.
- Landau, L. (1941). Theory of the superfluidity of helium II. *Phys. Rev.*, 60(4):356.
- Lasiecka, I. and Wang, X. (2015). Moore–Gibson–Thompson equation with memory, part II: General decay of energy. *Journal of Differential Equations*, 259(12):7610–7635.
- Lasiecka, I. and Wang, X. (2016). Moore–Gibson–Thompson equation with memory, part I: exponential decay of energy. *Zeitschrift für angewandte Mathematik und Physik*, 67(2):17.
- Lau, C.-P., Tai, Y.-T., and Lee, P. W. (1995). The effects of radiofrequency ablation versus medical therapy on the quality-of-life and exercise capacity in patients with accessory pathway-mediated supraventricular tachycardia: A treatment comparison study. *Pacing and Clinical Electrophysiology*, 18(3):424–432.
- Lebon, G. (1980). Variational principles in thermomechanics. *Recent developments in thermomechanics of solids*, 282:221–415.
- Li, X., Li, C., Xue, Z., and Tian, X. (2018a). Analytical study of transient thermo-mechanical responses of dual-layer skin tissue with variable thermal material properties. *International Journal of Thermal Sciences*, 124:459–466.
- Li, X., Li, C., Xue, Z., and Tian, X. (2019). Investigation of transient thermo-mechanical responses on the triple-layered skin tissue with temperature dependent blood perfusion rate. *International Journal of Thermal Sciences*, 139:339–349.
- Li, X., Xue, Z., and Tian, X. (2018b). A modified fractional order generalized bio-thermoelastic theory with temperature-dependent thermal material properties. *International Journal of Thermal Sciences*, 132:249–256.
- Liang, H., Lan, M., and Zhang, J. (2023). Influences of relaxation times and interface effect on the reflection and transmission of thermoelastic waves under the MGL model. *Mechanics of Solids*, 58(2):572–585.
- Lifshitz, E. M. and M, K. A. (1958). Theory of the Shubnikov–de Haas effect. *Journal of Physics and Chemistry of Solids*, 4:1.
- Lin, S.-M. and Li, C.-Y. (2016). Analytical solutions of non-Fourier bio-heat conductions for skin subjected to pulsed laser heating. *International Journal of Thermal Sciences*, 110:146–158.
- Liu, J., Chen, X., and Xu, L. X. (1999). New thermal wave aspects on burn evaluation of skin subjected to instantaneous heating. *IEEE transactions on biomedical*

- engineering*, 46(4):420–428.
- Liu, J., Ren, Z., and Wang, C. (1995). Thermal wave theory about temperature oscillations effect in living tissues. *Chinese Journal of Physics*, 12(4):215–218.
- Liu, J., Ren, Z. P., and Wang, C. C. (1996). Simulating experimental study on the mechanisms of temperature oscillation in living tissue. *Journal of Basic Science and Engineering*, 4(2):173–182.
- Liu, J., Wang, C., and Ren, Z. (1997). Theory and experiments on temperature oscillations effects in living tissues. *Journal-Tsinghua University*, 37:91–95.
- Liu, K.-C. (2015). Analysis for high-order effects in thermal lagging to thermal responses in biological tissue. *International Journal of Heat and Mass Transfer*, 81:347–354.
- Liu, K.-C. and Chen, H.-T. (2010). Investigation for the dual phase lag behavior of bio-heat transfer. *International Journal of Thermal Sciences*, 49(7):1138–1146.
- Liu, K.-C. and Chen, Y.-S. (2016). Analysis of heat transfer and burn damage in a laser irradiated living tissue with the generalized dual-phase-lag model. *International Journal of Thermal Sciences*, 103:1–9.
- Lord, H. W. and Lopez, A. A. (1970). Wave propagation in thermoelastic solids at very low temperature. *Acta Mechanica*, 10(1-2):85.
- Lord, H. W. and Shulman, Y. (1967). A generalized dynamical theory of thermoelasticity. *J. Mech. Phys. Solids*, 15(5):299–309.
- Lotfy, K. (2012). Mode-I crack in a two-dimensional fibre-reinforced generalized thermoelastic problem. *Chinese Physics B*, 21(1):014209.
- Magaña Nieto, A., Muñoz Rivera, J. E., Naso, M. G., and Quintanilla de Latorre, R. (2018). Qualitative results for a mixture of Green-Lindsay thermoelastic solids. *Chaotic Modeling and Simulation*, (3):285–294.
- Maizel, V. M. (1951). The temperature problem of elasticity theory. *Publishers of the Academy of Sciences of Ukrainian SSR, Kiev*.
- Mallik, S. H. and Kanoria, M. (2008). A two dimensional problem for a transversely isotropic generalized thermoelastic thick plate with spatially varying heat source. *Eur. J. Mech. Solids*, 27(4):607–621.
- Marchand, R., McDevitt, T., and Triggiani, R. (2012). An abstract semigroup approach to the third-order Moore–Gibson–Thompson partial differential equation arising in high-intensity ultrasound: structural decomposition, spectral analysis, exponential stability. *Mathematical Methods in the Applied Sciences*, 35(15):1896–1929.
- Marin, M., Öchsner, A., and Bhatti, M. M. (2020). Some results in Moore-Gibson-Thompson thermoelasticity of dipolar bodies. *ZAMM-Journal of Applied Mathemat-*

- ics and Mechanics*, 100(12):e202000090.
- Maurer, M. J. (1969). Relaxation model for heat conduction in metals. *Journal of Applied Physics*, 40(13):5123–5130.
- Maurer, M. J. and Thompson, H. A. (1973). Non-Fourier effects at high heat flux. *J. Heat Transfer*, 95(2):284–286.
- Maurer, R. D. and Herlin, M. A. (1949). Second sound velocity in helium II. *Phys. Rev.*, 76(7):948.
- Maxwell, J. C. et al. (1867). IV. on the dynamical theory of gases. *Philos. Trans. Roy. Soc. London*, 157:49–88.
- McNelly, T. F., Rogers, S. J., Channin, D. J., Rollefson, R. J., Goubau, W. M., Schmidt, G. E., Krumhansl, J. A., and Pohl, R. O. (1970). Heat pulses in NaF: onset of second sound. *Physical Review Letters*, 24(3):100.
- Mengi, Y. and Turhan, D. (1978). The influence of the retardation time of the heat flux on pulse propagation. *J. Appl. Mech.*, 45(2):433–435.
- Misra, J. C., Chattopadhyay, N. C., and Chakravorty, A. (2000). Study of thermoelastic wave propagation in a half-space using GN theory. *Journal of Thermal Stresses*, 23(4):327–351.
- Misra, J. C., Chattopadhyay, N. C., and Samanta, S. C. (1996). Study of the thermoelastic interactions in an elastic half space subjected to a ramp-type heating—a state-space approach. *International journal of engineering science*, 34(5):579–596.
- Misra, J. C., Kar, S. B., and Samanta, S. C. (1987). Effects of mechanical and thermal relaxations on the stresses in a heated viscoelastic continuum with a cylindrical hole. *Trans. Can. Soc. Mech. Eng.*, 11(3):151–159.
- Mitra, K., Kumar, S., Vedevarz, A., and Moallemi, M. K. (1995). Experimental evidence of hyperbolic heat conduction in processed meat. *Journal of Heat Transfer*, 117:568–573.
- Mohamed, M. S., Lotfy, K., El-Bary, A., and Mahdy, A. M. S. (2021). Absorption illumination of a 2D rotator semi-infinite thermoelastic medium using a modified Green and Lindsay model. *Case Studies in Thermal Engineering*, 26:101165.
- Morse, P. M. (1953). *Methods of Theoretical Physics*. New York: McGraw-Hill Book Co., Inc.
- Mukhopadhyay, B., Bera, R., and Debnath, L. (1991). On generalized thermoelastic disturbances in an elastic solid with a spherical cavity. *Int. J. Stoch. Anal.*, 4(3):225–240.
- Mukhopadhyay, B. and Bera, R. K. (1989). Effect of distributed instantaneous and

- continuous heat sources in an infinite conducting magneto-thermo-viscoelastic solid with thermal relaxation. *Computers & Mathematics with Applications*, 18(8):723–728.
- Mukhopadhyay, S., Kothari, S., and Kumar, R. (2011a). A domain of influence theorem for thermoelasticity with dual phase-lags. *Journal of Thermal Stresses*, 34(9):923–933.
- Mukhopadhyay, S., Kothari, S., and Kumar, R. (2014). Dual phase-lag thermoelasticity. In *Encyclopedia of Thermal Stresses*, pages 1003–1019. Springer.
- Mukhopadhyay, S. and Kumar, R. (2010). State-space approach to thermoelastic interactions in generalized thermoelasticity type III. *Arch. Appl. Mech.*, 80(8):869–881.
- Mukhopadhyay, S. and Kumar, R. (2016). Study of a problem of annular cylinder under two-temperature thermoelasticity with thermal relaxation parameters. In *Recent Advances in Mathematics, Statistics and Computer Science*, pages 69–79. World Scientific.
- Mukhopadhyay, S., Prasad, R., and Kumar, R. (2011b). Variational and reciprocal principles in linear theory of type-III thermoelasticity. *Math. Mech. Solids*, 16(4):435–444.
- Müller, I. (1967). On the entropy inequality. *Archive for Rational Mechanics and Analysis*, 26(2):118–141.
- Muller, I. (1971). The coldness, a universal function in thermoelastic bodies. *Archive for Rational Mechanics and Analysis*, 41(5):319–332.
- Nettleton, R. E. (1960). Relaxation theory of thermal conduction in liquids. *The Physics of Fluids*, 3(2):216–225.
- Neumann, K. E. (1841). Die gesetze der doppelbrechung des lichts in comprimierten oder ungleichförmig erwärmten unkrystallinischen körpern. *Ann. Phys.*, 130(12):449–476.
- Ng, E. Y. K., Tan, H. M., and Ooi, E. H. (2009). Boundary element method with bioheat equation for skin burn injury. *Burns*, 35(7):987–997.
- Ng, E. Y. K., Tan, H. M., and Ooi, E. H. (2010). Prediction and parametric analysis of thermal profiles within heated human skin using the boundary element method. *Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences*, 368(1912):655–678.
- Nowacki, W. (1969). *Progress in thermoelasticity*. Polish Academy of Sciences.
- Nowacki, W. (1975). Fundamental relations and equations of thermoelasticity. *Dynamic Problems of Thermoelasticity, English Edition, Noordhoff Int. Pub., Leyden, The Netherlands*.

- Nowinski, J. L. (1978). *Theory of thermoelasticity with applications*, volume 3. Sijthoff & Noordhoff International Publishers.
- Othman, M. I. A. (2003). State-space approach to generalized thermoelasticity plane waves with two relaxation times under dependence of the modulus of elasticity on reference temperature. *Can. J. Phys.*, 81(12):1403–1418.
- Othman, M. I. A., Elmaklizi, Y. D., and Said, S. M. (2013). Generalized thermoelastic medium with temperature-dependent properties for different theories under the effect of gravity field. *Int. J. Thermophys.*, 34(3):521–537.
- Parkus, H. (2012). *Thermoelasticity*. Springer Science & Business Media.
- Pellam, J. R. and Scott, R. B. (1949). Second sound velocity in paramagnetically cooled liquid helium II. *Physical Review*, 76(6):869.
- Pellicer, M. and Quintanilla, R. (2020). On uniqueness and instability for some thermo-mechanical problems involving the Moore–Gibson–Thompson equation. *Zeitschrift für angewandte Mathematik und Physik*, 71:1–21.
- Pennes, H. H. (1948). Analysis of tissue and arterial blood temperatures in the resting human forearm. *Journal of Applied Physiology*, 1(2):93–122.
- Peshkov, V. (1944). The second sound in helium II. *J. Phys.*, 8:381.
- Picard, R. (2009). A structural observation for linear material laws in classical mathematical physics. *Mathematical Methods in the Applied Sciences*, 32(14):1768–1803.
- Prasad, R. (2012). *A two dimensional problem of Mode-I crack in a type III thermoelastic medium*. PhD thesis, Institute of Technology (BHU), Varanasi, India.
- Prasad, R., Das, S., and Mukhopadhyay, S. (2013). Boundary integral equation formulation for coupled thermoelasticity with three phase-lags. *Mathematics and Mechanics of Solids*, 18(1):44–58.
- Prasad, R., Kumar, R., and Mukhopadhyay, S. (2010). Propagation of harmonic plane waves under thermoelasticity with dual-phase-lags. *International Journal of Engineering Science*, 48(12):2028–2043.
- Prasad, R., Kumar, R., and Mukhopadhyay, S. (2011). Effects of phase lags on wave propagation in an infinite solid due to a continuous line heat source. *Acta Mechanica*, 217(3):243–256.
- Predeleanu, M. (1959). On thermal stresses in visco-elastic bodies. *Bulletin mathématique de la Société des Sciences Mathématiques et Physiques de la République Populaire Roumaine*, 3(2):223–228.
- Puri, P. (1973). Plane waves in generalized thermoelasticity. *International Journal of Engineering Science*, 11(7):735–744.

- Quintanilla, R. (1999). On the spatial behavior in thermoelasticity without energy dissipation. *Journal of thermal stresses*, 22(2):213–224.
- Quintanilla, R. (2001). Structural stability and continuous dependence of solutions of thermoelasticity of type III. *Discrete and Continuous Dynamical Systems-B*, 1(4):463–470.
- Quintanilla, R. (2002a). Existence in thermoelasticity without energy dissipation. *Journal of thermal stresses*, 25(2):195–202.
- Quintanilla, R. (2002b). Exponential stability in the dual-phase-lag heat conduction theory. *J. Non-Equilib. Thermodyn.*, 27(3):217–227.
- Quintanilla, R. (2003). A condition on the delay parameters in the one-dimensional dual-phase-lag thermoelastic theory. *Journal of Thermal Stresses*, 26(7):713–721.
- Quintanilla, R. (2018). Some qualitative results for a modification of the Green–Lindsay thermoelasticity. *Meccanica*, 53(14):3607–3613.
- Quintanilla, R. (2019). Moore–Gibson–Thompson thermoelasticity. *Mathematics and Mechanics of Solids*, 24(12):4020–4031.
- Quintanilla, R., Racke, R., and Ueda, Y. (2023). Decay for thermoelastic Green-Lindsay plates in bounded and unbounded domains. *Communications on Pure and Applied Analysis*, 22(1):167–191.
- Quintanilla, R. and Straughan, B. (2004). A note on discontinuity waves in type III thermoelasticity. *Proceedings of the Royal Society of London. Series A: Mathematical, Physical and Engineering Sciences*, 460(2044):1169–1175.
- Ramamurthy, D. and Sharma, A. V. (1991). A problem of thermal shock with thermal relaxation. *International Journal of Mathematics and Mathematical Sciences*, 14(3):587–594.
- Rizzo, F. J. (1967). An integral equation approach to boundary value problems of classical elastostatics. *Quarterly of applied mathematics*, 25(1):83–95.
- Rizzo, F. J. and Shippy, D. J. (1977). An advanced boundary integral equation method for three-dimensional thermoelasticity. *International Journal for Numerical Methods in Engineering*, 11(11):1753–1768.
- Roemer, R. B., Oleson, J. R., and Cetas, T. C. (1985). Oscillatory temperature response to constant power applied to canine muscle. *American Journal of Physiology-Regulatory, Integrative and Comparative Physiology*, 249(2):R153–R158.
- Rogers, S. J. (1971). Transport of heat and approach to second sound in some isotopically pure alkali-halide crystals. *Physical Review B*, 3(4):1440.
- RoyChoudhuri, S. K. (2007a). On a thermoelastic three-phase-lag model. *Journal of*

- Thermal Stresses*, 30(3):231–238.
- RoyChoudhuri, S. K. (2007b). One-dimensional thermoelastic waves in elastic half-space with dual phase-lag effects. *Journal of Mechanics of Materials and Structures*, 2(3):489–503.
- Roychoudhuri, S. K. and Bandyopadhyay, N. (2005). Thermoelastic wave propagation in a rotating elastic medium without energy dissipation. *International Journal of Mathematics and Mathematical Sciences*, 2005:99–107.
- Roychoudhuri, S. K. and Bhatta, N. (1983). On generalised spherically symmetric thermo-elastic wave propagation. *J. Math. Phys. Sci.*, 17:551–565.
- Sadd, M. H. and Cha, C. Y. (1982). Axisymmetric non-fourier temperatures in cylindrically bounded domains. *Int. J. Non Linear Mech.*, 17(3):129–136.
- Sarkar, I. (2021). Temperature-rate dependence thermoelasticity theory with memory-dependent derivative: Stability and uniqueness. *Journal of Engineering Mechanics*, 147(3):04021003.
- Sarkar, N. (2017). Temperature dependence of the elastic modulus in three-dimensional generalized thermoelasticity with dual-phase-lag effects. *Computational Mathematics and Modeling*, 28:208–227.
- Sarkar, N. and De, S. (2020). Waves in magneto-thermoelastic solids under modified Green–Lindsay model. *Journal of Thermal Stresses*, 43(5):594–611.
- Sarkar, N., De, S., and Sarkar, N. (2020a). Modified Green–Lindsay model on the reflection and propagation of thermoelastic plane waves at an isothermal stress-free surface. *Indian Journal of Physics*, 94(8):1215–1225.
- Sarkar, N., Mondal, S., and Othman, M. I. A. (2020b). Effect of the laser pulse on transient waves in a non-local thermoelastic medium under Green-Naghdi theory. *Structural Engineering and Mechanics*, 74(4):471–479.
- Scalia, A. (1990). On some theorems in the theory of micropolar thermoelasticity. *International journal of engineering science*, 28(3):181–189.
- Semwal, S. and Mukhopadhyay, S. (2014). Boundary integral equation formulation for generalized thermoelastic diffusion–analytical aspects. *Applied Mathematical Modelling*, 38(14):3523–3537.
- Shakeriaski, F., Ghodrati, M., Escobedo-Diaz, J., and Behnia, M. (2021a). Modified Green–Lindsay thermoelasticity wave propagation in elastic materials under thermal shocks. *Journal of Computational Design and Engineering*, 8(1):36–54.
- Shakeriaski, F., Ghodrati, M., Escobedo-Diaz, J., and Behnia, M. (2021b). Recent advances in generalized thermoelasticity theory and the modified models: a review.

- Journal of Computational Design and Engineering*, 8(1):15–35.
- Sharma, J. N. (1987). Transient generalized thermoelastic waves in transversely isotropic medium with a cylindrical hole. *International journal of engineering science*, 25(4):463–471.
- Sharma, J. N. (1997). An alternate state space approach to generalized thermoelasticity. *Journal of thermal stresses*, 20(2):115–127.
- Sharma, J. N. and Chand, D. (1991). Distribution of temperature and stresses in an elastic plate resulting from a suddenly punched hole. *Journal of Thermal Stresses*, 14(4):455–464.
- Sharma, J. N. and Chand, D. (1996). Vibrations in a transversely isotropic plate due to suddenly punched hole. *Indian J. Pure Appl. Math.*, 27:217–226.
- Sharma, J. N., Kumar, V., and Chand, D. (2003). Reflection of generalized thermoelastic waves from the boundary of a half-space. *Journal of Thermal Stresses*, 26(10):925–942.
- Sharma, J. N. and Singh, H. (1989). Generalized thermoelastic waves in anisotropic media. *J. Acoust. Soc. Am*, 85(4):1407–1413.
- Sharma, K. R. (2005). *Damped wave transport and relaxation*. Elsevier.
- Shashkov, A. G. and Yu, Y. S. (1977). The structure of one-dimensional thermal stresses. 33(5):912–921.
- Sherief, H. H. (1987). On uniqueness and stability in generalized thermoelasticity. *Quarterly of Applied Mathematics*, 44(4):773–778.
- Sherief, H. H. (1992). Fundamental solution for thermoelasticity with two relaxation times. *International journal of engineering science*, 30(7):861–870.
- Sherief, H. H. and Anwar, M. N. (1986). Problem in generalized thermoelasticity. *Journal of Thermal Stresses*, 9(2):165–181.
- Sherief, H. H. and Anwar, M. N. (1988). A problem in generalized thermoelasticity for an infinitely long annular cylinder. *International Journal of Engineering Science*, 26(3):301–306.
- Sherief, H. H., El-Maghraby, N. M., and Abbas, M. F. (2022). Two-dimensional axisymmetric thermoelastic problem for an infinite-space with a cylindrical heat source of a different material under Green–Lindsay theory. *Mechanics Based Design of Structures and Machines*, 50(10):3404–3416.
- Shivay, O. N. (2021). *Studies on temperature rate dependent thermoelasticity and porothermoelasticity*. PhD thesis, Indian institute of technology (BHU), Varanasi, India.

- Shivay, O. N. and Mukhopadhyay, S. (2019). Some basic theorems on a recent model of linear thermoelasticity for a homogeneous and isotropic medium. *Mathematics and Mechanics of Solids*, 24(8):2444–2457.
- Singh, B. (2013). Wave propagation in dual-phase-lag anisotropic thermoelasticity. *Continuum Mechanics and Thermodynamics*, 25(5):675–683.
- Singh, B. and Mukhopadhyay, S. (2023). Thermoelastic vibration of timoshenko beam under the modified couple stress theory and the Moore–Gibson–Thompson heat conduction model. *Mathematics and Mechanics of Solids*, 0(0).
- Singh, R. V. and Mukhopadhyay, S. (2021). Study of wave propagation in an infinite solid due to a line heat source under Moore–Gibson–Thompson thermoelasticity. *Acta Mechanica*, 232(12):4747–4760.
- Sinha, S. B. and Elsibai, K. A. (1996). Reflection of thermoelastic waves at a solid half-space with two relaxation times. *Journal of Thermal Stresses*, 19(8):749–762.
- Sladek, V. and Sladek, J. (1983). Boundary integral equation method in thermoelasticity part I: general analysis. *Applied mathematical modelling*, 7(4):241–253.
- Sladek, V. and Sladek, J. (1984). Boundary integral equation method in thermoelasticity part III: Uncoupled thermoelasticity. *Applied mathematical modelling*, 8(6):413–418.
- Stehfest, H. (1970). Algorithm 368: Numerical inversion of Laplace transforms [D5]. *Commun. ACM*, 13(1):47–49.
- Straughan, B. (2011). *Heat waves*, volume 177. Springer Science & Business Media.
- Suhubi, E. S. (1975). Thermoelastic solids. In *Continuum Mechanics of Single-Substance Bodies*, pages 173–265. Elsevier.
- Svanadze, M., Tibullo, V., and Zampoli, V. (2006). Fundamental solution in the theory of micropolar thermoelasticity without energy dissipation. *Journal of Thermal Stresses*, 29(1):57–66.
- Symm, G. T. (1963). Integral equation methods in potential theory. II. *Proceedings of the Royal Society of London. Series A. Mathematical and Physical Sciences*, 275(1360):33–46.
- Szekeres, A. (1980). Equation system of thermoelasticity using the modified law of thermal conductivity. *Periodica Poly. Mech. Eng.*, 24(1):253–261.
- Tao, D. and Prevost, J. H. (1984). Relaxation effects on generalized thermoelastic waves. *Journal of thermal stresses*, 7(1):79–89.
- Tayel, I. M., Alebraheem, J., Asad, S., El-Bary, A., and Lotfy, K. (2022). Surface absorption illumination in a 2D thermoelastic semi-infinite medium under modified

- green and lindsay model. *Alexandria Engineering Journal*, 61(3):2250–2259.
- Tayel, I. M. and Lotfy, K. (2021). Photothermal effects in semiconductors induced by surface absorption of a uniform laser radiation under modified Green-Lindsay theory. *The European Physical Journal Plus*, 136(9):1–17.
- Thomson, W. (1857). On the thermoelastic and thermo- magnetic properties of matter. *Q. J. Math.*, 1:57–77.
- Tien, C. L., Majumdar, A., and Gerner, F. M. (1998). *Microscale energy transport*. Taylor Francis, Washington.
- Tisza, L. (1947). The theory of liquid helium. *Phys. Rev.*, 72(9):838.
- Tiwari, R. (2017). *Mathematical Modeling on advanced thermoelasticity and magneto thermoelasticity*. PhD thesis, Indian institute of technology (BHU), Varanasi, India.
- Tiwari, R. and Mukhopadhyay, S. (2017). On electromagneto-thermoelastic plane waves under Green–Naghdi theory of thermoelasticity-II. *Journal of Thermal Stresses*, 40(8):1040–1062.
- Tzou, D. Y. (1992). Thermal shock phenomena under high rate response in solids. *Annual review of heat transfer*, 4(4).
- Tzou, D. Y. (1993). An engineering assessment to the relaxation time in thermal wave propagation. *Int. J. Heat Mass Transfer*, 36(7):1845–1851.
- Tzou, D. Y. (1995a). The generalized lagging response in small-scale and high-rate heating. *Int. J. Heat Mass Transfer*, 38(17):3231–3240.
- Tzou, D. Y. (1995b). A unified field approach for heat conduction from macro-to micro-scales. *J. Heat Transfer*, 117(1):8–16.
- Tzou, D. Y. (2014). *Macro-to microscale heat transfer: the lagging behavior*. John Wiley & Sons.
- Vedavarz, A., Kumar, S., and Moallemi, M. K. (1994). Significance of non-Fourier heat waves in conduction. *J. Heat Transfer*, 116(1):221–224.
- Vernotte, P. (1958). Les paradoxes de la théorie continue de l'équation de la chaleur. *Compt. Rend.*, 246:3154–3155.
- Vernotte, P. (1961). Some possible complications in the phenomena of thermal conduction. *Compt. Rend.*, 252:2190–2191.
- Vlase, S., Marin, M., Scutaru, M., and Munteanu, R. (2017). Coupled transverse and torsional vibrations in a mechanical system with two identical beams. *AIP Advances*, 7(6):065301.
- Voigt, W. (1928). *Textbook of crystal physics*, volume 2. BB Teubner, Leipzig.
- Wadhawan, M. C. (1972). Radially symmetrical thermoelastic disturbances in gener-

- alised dynamical theory of thermoelasticity. *pure and applied geophysics*, 99:61–71.
- Wadhawan, M. C. (1973). Thermoelastic response of a cylinder in the generalised dynamical theory of thermoelasticity. *pure and applied geophysics*, 102:37–50.
- Wang, J. and Dhaliwal, R. S. (1993). Fundamental solutions of the generalized thermoelastic equations. *Journal of thermal stresses*, 16(2):135–161.
- Wang, J. and Slattery, S. P. (2002). Thermoelasticity without energy dissipation for initially stressed bodies. *International Journal of Mathematics and Mathematical Sciences*, 31:329–337.
- Wang, Y. Z., Li, M. J., and Liu, D. (2021). Thermo-mechanical interaction on transient heating of skin tissue with variable thermal material properties. *European Journal of Mechanics-A/Solids*, 86:104173.
- Ward, J. C. and Wilks, J. (1951). The velocity of second sound in liquid helium near the absolute zero. *The London, Edinburgh, and Dublin Philosophical Magazine and Journal of Science*, 42(326):314–316.
- Wei, W., Zheng, R., Liu, G., and Tao, H. (2016). Reflection and refraction of P wave at the interface between thermoelastic and porous thermoelastic medium. *Transport in Porous Media*, 113:1–27.
- Xu, F. and Lu, T. J. (2009). Skin biothermomechanics: modeling and experimental characterization. *Advances in Applied Mechanics*, 43:147–248.
- Xu, F., Lu, T. J., and Seffen, K. A. (2008a). Biothermomechanics of skin tissues. *Journal of the Mechanics and Physics of Solids*, 56(5):1852–1884.
- Xu, F., Seffen, K. A., and Lu, T. J. (2008b). Non-Fourier analysis of skin biothermomechanics. *International Journal of Heat and Mass Transfer*, 51(9-10):2237–2259.
- Xu, F., Wen, T., Lu, T. J., and Seffen, K. A. (2008c). Skin biothermomechanics for medical treatments. *Journal of the Mechanical Behavior of Biomedical Materials*, 1(2):172–187.
- Youssef, H. M. (2006). Problem of generalized thermoelastic infinite medium with cylindrical cavity subjected to a ramp-type heating and loading. *Arch. Appl. Mech.*, 75(8-9):553–565.
- Youssef, H. M. (2009). Generalized thermoelastic infinite medium with cylindrical cavity subjected to moving heat source. *Mechanics Research Communications*, 36(4):487–496.
- Youssef, H. M. and El-Bary, A. A. (2014). Thermoelastic material response due to laser pulse heating in context of four theorems of thermoelasticity. *Journal of thermal stresses*, 37(12):1379–1389.

- Yu, Y. J., Xue, Z.-N., and Tian, X.-G. (2018). A modified Green–Lindsay thermoelasticity with strain rate to eliminate the discontinuity. *Meccanica*, 53(10):2543–2554.
- Zenkour, A. M. (2015). Three-dimensional thermal shock plate problem within the framework of different thermoelasticity theories. *Composite Structures*, 132:1029–1042.
- Zenkour, A. M. (2022). Thermal diffusion of an unbounded solid with a spherical cavity via refined three-phase-lag Green–Naghdi models. *Indian Journal of Physics*, 96(4):1087–1104.
- Zenkour, A. M., Mashat, D. S., and Abouelregal, A. E. (2013). The effect of dual-phase-lag model on reflection of thermoelastic waves in a solid half space with variable material properties. *Acta Mechanica Solida Sinica*, 26(6):659–670.
- Zhang, Q., Sun, Y., and Yang, J. (2021). Thermoelastic responses of biological tissue under thermal shock based on three phase lag model. *Case Studies in Thermal Engineering*, 28:101376.
- Zhang, Y. (2009). Generalized dual-phase lag bioheat equations based on nonequilibrium heat transfer in living biological tissues. *International Journal of Heat and Mass Transfer*, 52(21-22):4829–4834.
- Zhang, Y., Chen, B., and Li, D. (2017). Non-Fourier effect of laser-mediated thermal behaviors in bio-tissues: A numerical study by the dual-phase-lag model. *International Journal of Heat and Mass Transfer*, 108:1428–1438.
- Zhang, Z. M., Zhang, Z. M., and Luby (2007). *Nano/microscale heat transfer*, volume 410. Springer.
- Zhou, J., Chen, J., and Zhang, Y. (2009). Dual-phase lag effects on thermal damage to biological tissues caused by laser irradiation. *Computers in Biology and Medicine*, 39(3):286–293.
- Zhou, J., Chen, J. K., and Zhang, Y. (2007). Theoretical analysis of thermal damage in biological tissues caused by laser irradiation. *Molecular and Cellular Biomechanics*, 4(1):27.

PUBLICATIONS AND CONFERENCES

Publication Related to the Thesis:

1. **Robin Vikram Singh** and Santwana Mukhopadhyay. "An investigation on strain and temperature rate-dependent thermoelasticity and its infinite speed behavior", *Journal of Thermal Stresses* 43.3 (2020):269-283. Taylor & Francis (SCI, IF: 3.280).
2. **Robin Vikram Singh** and Santwana Mukhopadhyay. "Relaxation effects on thermoelastic interactions for time-dependent moving heat source under a recent model of thermoelasticity", *Zeitschrift für angewandte Mathematik und Physik* 72.31 (2021): 1-13. Springer (SCI, IF: 1.93).
3. **Robin Vikram Singh**, and Santwana Mukhopadhyay. "Study of wave propagation in an infinite solid due to a line heat source under Moore-Gibson-Thompson thermoelasticity", *Acta Mechanica* 232 (2021): 4747-4760. Springer (SCI, IF: 2.7).
4. **Robin Vikram Singh** and Santwana Mukhopadhyay. "Mathematical significance of strain rate and temperature rate on heat conduction in thermoelastic material due to line heat source", *Journal of Thermal Stresses* 46.11 (2023): 1-16. Taylor & Francis (SCI, IF: 3.280).
5. **Robin Vikram Singh** and Santwana Mukhopadhyay. "Study the effects of temperature and strain rates on transient thermomechanical responses on multilayer skin tissue", *European Journal of Mechanics-A/Solids* 100 (2023): 105028. Elsevier (SCI, IF: 4.220).
6. **Robin Vikram Singh** and Santwana Mukhopadhyay. "Boundary Integral Equation Formulation for Strain and Temperature-rate Dependent Thermoelasticity", Communicated to an International Journal, (2023)

Conferences and Workshops:

1. Participated in *64th International Congress of ISTAM* held at IIT Bhubaneswar during December 9-12, 2019 and presented a work with the title “An analysis on strain and temperature rate-dependent thermoelasticity and its infinite speed behaviour.”
2. Attended training programme on *Tools for Scientific Documentation: LaTeX, JabRef, DocEar and other open source software* held at DST, Banaras Hindu University during January 2-12, 2018.
3. Participated in *Annual Foundation School (AFS-1)* held at Department of Mathematics, IISER Pune during 7 May to 2 June, 2018
4. Participated in *online Faculty Induction Programme* from 01 November 2022 to 05 December 2022 organized by UGC Human Resource Development Centre, Aligarh Muslim University, Aligarh.

APPENDIX

Appendix I:

Expressions of various notations used in chapter 2 are given below:

$$\begin{aligned}
t_{11} &= \tau_1(p_1 - \tau_0) - \epsilon\tau_0\tau_1, t_{12} = p_1 - \tau_0 + \tau_1(p_2 - 1) - (\tau_0 + \tau_1)\epsilon, \\
t_{13} &= \tau_1p_3 + p_2 - 1 - \epsilon, t_{14} = p_3, t_{21} = \frac{1}{a_2} \left(\frac{n_{11}t_{11}}{\tau_0} \right), t_{22} = \frac{1}{a_2} \left(-\frac{n_{11}t_{11}}{\tau_0^2} + \frac{n_{12}t_{11}+n_{11}t_{12}}{\tau_0} \right), \\
t_{23} &= \frac{1}{a_2} \left(\frac{n_{11}t_{11}}{\tau_0^3} - \frac{n_{12}t_{11}+n_{11}t_{12}}{\tau_0^2} + \frac{n_{11}t_{13}+n_{12}t_{12}+n_{13}t_{11}}{\tau_0} \right), \\
t_{24} &= \frac{1}{a_2} \left(-\frac{n_{11}t_{11}}{\tau_0^4} + \frac{n_{12}t_{11}+n_{11}t_{12}}{\tau_0^3} - \frac{n_{11}t_{13}+n_{12}t_{12}+n_{13}t_{11}}{\tau_0^2} + \frac{n_{11}t_{14}+n_{12}t_{13}+n_{13}t_{12}}{\tau_0} \right), \\
t_{31} &= -(1 + \epsilon)\tau_0\tau_1, t_{32} = -\tau_0 + (p_1 - 1)\tau_1 - \epsilon(\tau_0 + \tau_1), \\
t_{33} &= p_1 - 1 + p_2\tau_1 - \epsilon, t_{34} = p_2 + p_3\tau_1, t_{41} = \frac{1}{a_2} \left(\frac{n_{21}t_{31}}{\tau_0} \right), t_{42} = \frac{1}{a_2} \left(-\frac{n_{21}t_{31}}{\tau_0^2} + \frac{n_{22}t_{31}+n_{21}t_{32}}{\tau_0} \right) \\
t_{43} &= \frac{1}{a_2} \left(\frac{n_{21}t_{31}}{\tau_0^3} - \frac{n_{22}t_{31}+n_{21}t_{32}}{\tau_0^2} + \frac{n_{21}t_{33}+n_{22}t_{32}+n_{23}t_{31}}{\tau_0} \right), \\
t_{44} &= \frac{1}{a_2} \left(-\frac{n_{21}t_{31}}{\tau_0^4} + \frac{n_{22}t_{31}+n_{21}t_{32}}{\tau_0^3} - \frac{n_{21}t_{33}+n_{22}t_{32}+n_{23}t_{31}}{\tau_0^2} + \frac{n_{21}t_{34}+n_{22}t_{33}+n_{23}t_{32}}{\tau_0} \right), \\
t_{51} &= \tau_1t_{21}n_{11}, t_{52} = \tau_1t_{22}n_{11} + t_{21}(n_{11} + n_{12}\tau_1) - a_1\tau_1, \\
t_{53} &= t_{21}(n_{12} + n_{13}\tau_1) + t_{22}(n_{11} + n_{12}\tau_1) + \tau_1t_{23}n_{11} - a_1, \\
t_{54} &= t_{21}n_{13} + t_{22}(n_{12} + n_{13}\tau_1) + t_{23}(n_{11} + n_{12}\tau_1) + \tau_1t_{24}n_{11}, \\
T_{51} &= \tau_1t_{21}n_{11}, T_{52} = \tau_1t_{22}n_{11} + t_{21}(n_{11} + n_{12}\tau_1) - \frac{a_1\tau_1}{\lambda_1}, \\
T_{53} &= t_{21}(n_{12} + n_{13}\tau_1) + t_{22}(n_{11} + n_{12}\tau_1) + \tau_1t_{23}n_{11} - \frac{a_1}{\lambda_1}, \\
T_{54} &= t_{21}n_{13} + t_{22}(n_{12} + n_{13}\tau_1) + t_{23}(n_{11} + n_{12}\tau_1) + \tau_1t_{24}n_{11}, \\
t_{61} &= \tau_1t_{41}n_{21} - a_1\tau_1, T_{61} = \tau_1t_{41}n_{21} - \frac{a_1\tau_1}{\lambda_1}, \\
t_{62} &= \tau_1t_{42}n_{21} + t_{41}(n_{21} + n_{22}\tau_1) - a_1, T_{62} = \tau_1t_{42}n_{21} + t_{41}(n_{21} + n_{22}\tau_1) - \frac{a_1}{\lambda_1}, \\
t_{63} &= t_{41}(n_{22} + n_{23}\tau_1) + t_{42}(n_{21} + n_{22}\tau_1) + \tau_1t_{43}n_{21}, \\
T_{63} &= t_{41}(n_{22} + n_{23}\tau_1) + t_{42}(n_{21} + n_{22}\tau_1) + \tau_1t_{43}n_{21}, \\
t_{64} &= t_{41}n_{23} + t_{42}(n_{22} + n_{23}\tau_1) + t_{43}(n_{21} + n_{22}\tau_1) + \tau_1t_{44}n_{21}, \\
T_{64} &= t_{41}n_{23} + t_{42}(n_{22} + n_{23}\tau_1) + t_{43}(n_{21} + n_{22}\tau_1) + \tau_1t_{44}n_{21}, \\
a_{11} &= \frac{n_{12}}{n_{11}}, a_{12} = \frac{n_{12}}{n_{11}}, D_{11} = \frac{1}{\sqrt{n_{11}}}, D_{12} = \frac{1}{2} \frac{-a_{11}}{\sqrt{n_{11}}} - \frac{1}{8r(n_{11})^{\frac{3}{2}}}, \\
D_{13} &= \frac{1}{\sqrt{n_{11}}} \left(\frac{3a_{11}^2 - 4a_{12}}{8} \right) + \frac{1}{8r} \frac{3a_{11}}{2(n_{11})^{\frac{3}{2}}} + \frac{9}{128r^2} \frac{1}{(n_{11})^{\frac{5}{2}}},
\end{aligned}$$

$$\begin{aligned}
D_{14} &= \frac{1}{\sqrt{n_{11}}} \left(\frac{12a_{11}a_{12}-5a_{11}^3}{16} \right) - \frac{1}{8r} \frac{3(5a_{11}^2-4a_{12})}{8(n_{11})^{\frac{3}{2}}} - \frac{9}{128r^2} \frac{5a_{11}}{2(n_{11})^{\frac{5}{2}}}, \\
D_{21} &= \frac{1}{\sqrt{n_{21}}}, D_{22} = -\frac{1}{8r(n_{21})^{\frac{3}{2}}}, D_{23} = \frac{1}{2} \frac{-a_{21}}{\sqrt{n_{21}}} + \frac{9}{128r^2} \frac{1}{(n_{21})^{\frac{5}{2}}}, \\
D_{24} &= \frac{1}{8r} \frac{3(a_{21})}{2(n_{21})^{\frac{3}{2}}}, D_{25} = \frac{1}{\sqrt{n_{21}}} \left(\frac{-4a_{22}+3a_{21}^2}{8} \right) - \frac{9}{128r^2} \frac{5a_{21}}{2(n_{21})^{\frac{5}{2}}}, \\
D_{26} &= \frac{-1}{8r} \frac{(15a_{21}^2-12a_{22})}{8(n_{21})^{\frac{3}{2}}}, D_{31} = \frac{1}{\sqrt{n_{11}}}, D_{32} = \frac{1}{2} \frac{-a_{11}}{\sqrt{n_{11}}} + \frac{3}{8r(n_{11})^{\frac{3}{2}}}, \\
D_{33} &= \frac{1}{\sqrt{n_{11}}} \left(\frac{3a_{11}^2-4a_{12}}{8} \right) - \frac{3}{8r} \frac{3a_{11}}{2(n_{11})^{\frac{3}{2}}} - \frac{15}{128r^2} \frac{1}{(n_{11})^{\frac{5}{2}}}, \\
D_{34} &= \frac{1}{\sqrt{n_{11}}} \left(\frac{12a_{11}a_{12}-5a_{11}^3}{16} \right) + \frac{3}{8r} \frac{3(5a_{11}^2-4a_{12})}{8(n_{11})^{\frac{3}{2}}} + \frac{15}{128r^2} \frac{5a_{11}}{2(n_{11})^{\frac{5}{2}}}, \\
D_{41} &= \frac{1}{\sqrt{n_{21}}}, D_{42} = \frac{3}{8r(n_{21})^{\frac{3}{2}}}, D_{43} = \frac{1}{2} \frac{-a_{21}}{\sqrt{n_{21}}} - \frac{15}{128r^2} \frac{1}{(n_{21})^{\frac{5}{2}}}, D_{44} = \frac{-3}{8r} \frac{3(a_{21})}{2(n_{21})^{\frac{3}{2}}}, \\
D_{45} &= \frac{1}{\sqrt{n_{21}}} \left(\frac{-4a_{22}+3a_{21}^2}{8} \right) + \frac{15}{128r^2} \frac{5a_{21}}{2(n_{21})^{\frac{5}{2}}}, D_{46} = \frac{3}{8r} \frac{(15a_{21}^2-12a_{22})}{8(n_{21})^{\frac{3}{2}}}, \\
d_{rs} &= D_{rs}|_{r=a}, T_{61} = t_{51}d_{11}, T_{62} = t_{51}d_{12} + t_{52}d_{11} + \frac{(1-\lambda_1)}{a} \tau_1 t_{21}d_{31}, \\
T_{63} &= t_{51}d_{13} + t_{52}d_{12} + t_{53}d_{11} + \frac{(1-\lambda_1)}{a} (\tau_1 (t_{21}d_{32} + t_{22}d_{31}) + t_{21}d_{31}), \\
T_{64} &= t_{51}d_{14} + t_{52}d_{13} + t_{53}d_{12} + t_{54}d_{11} + \frac{(1-\lambda_1)}{a} (\tau_1 (t_{21}d_{33} + t_{22}d_{32} + t_{23}d_{31}) + t_{21}d_{32} + t_{22}d_{31}), \\
t_{71} &= t_{61}d_{21}, t_{72} = t_{61}d_{21} + \frac{(1-\lambda_1)}{a} \tau_1 t_{41}d_{41}, t_{73} = t_{61}d_{23} + t_{62}d_{21} + \frac{(1-\lambda_1)}{a} \tau_1 t_{41}d_{42}, \\
t_{74} &= t_{61}d_{24} + t_{62}d_{22} + \frac{(1-\lambda_1)}{a} (\tau_1 (t_{41}d_{43} + t_{42}d_{41}) + t_{41}d_{41}), \\
t_{75} &= t_{61}d_{25} + t_{62}d_{23} + t_{63}d_{21} + \frac{(1-\lambda_1)}{a} (\tau_1 (t_{41}d_{44} + t_{42}d_{42}) + t_{41}d_{42}), \\
t_{81} &= T_{61}d_{21}, t_{82} = T_{61}d_{22}, t_{83} = T_{61}d_{23} + T_{62}d_{21} - t_{71}d_{11}, t_{84} = T_{61}d_{24} + T_{62}d_{22} - t_{72}d_{11}, \\
t_{85} &= T_{61}d_{25} + T_{62}d_{23} + T_{63}d_{21} - t_{71}d_{12} - t_{73}d_{11}, t_{86} = T_{61}d_{26} + T_{62}d_{24} + T_{63}d_{22} - t_{72}d_{12} - t_{74}d_{11}, \\
t_{91} &= \frac{1}{t_{81}}, t_{92} = \frac{t_{82}}{t_{81}^2}, t_{93} = \frac{t_{82}^2 - t_{81}t_{83}}{t_{81}^3}, t_{94} = \frac{-t_{82}^3 + 2t_{81}t_{82}t_{83} - t_{81}^2t_{84}}{t_{81}^4}, \\
h_{11} &= t_{71}t_{91}, h_{12} = t_{71}t_{92} + t_{72}t_{91}, h_{13} = t_{71}t_{93} + t_{72}t_{92} + t_{73}t_{91}, h_{14} = t_{71}t_{94} + t_{72}t_{93} + \\
& t_{73}t_{92} + t_{74}t_{91} \\
h_{21} &= T_{61}t_{91}, h_{22} = T_{61}t_{92}, h_{23} = T_{61}t_{93} + T_{62}t_{91}, h_{24} = T_{61}t_{94} + T_{62}t_{92} \\
H_{21} &= -h_{11}D_{11}, H_{22} = -h_{12}D_{11}, H_{23} = h_{21}D_{21}, H_{24} = h_{21}D_{22} + h_{22}D_{21} \\
h_{31} &= t_{21}h_{11}D_{31}, h_{32} = t_{21}h_{12}D_{31}, h_{33} = t_{21} (h_{11}D_{32} + h_{13}D_{31}) + t_{22}h_{11}D_{31}, h_{34} = -t_{41}h_{21}D_{41} \\
h_{35} &= -t_{41}h_{21}D_{42} - t_{41}h_{22}D_{41}, h_{36} = -t_{42}h_{21}D_{41} - t_{41}h_{21}D_{43} - t_{41}h_{22}D_{42} - t_{41}h_{23}D_{41}, \\
h_{41} &= t_{51}H_{21}, h_{42} = t_{51}H_{22}, h_{52} = t_{61}H_{24} - \frac{(1-\lambda_1)h_{34}\tau}{r} \\
H_{41} &= \lambda_1 T_{51}H_{21}, H_{42} = \lambda_1 T_{51}H_{22}, H_{51} = \lambda_1 T_{61}H_{23}, H_{52} = \lambda_1 T_{61}H_{24} + \frac{(1-\lambda_1)h_{34}\tau}{r}.
\end{aligned}$$

Appendix II:

Expressions of various notations used in chapter 3 are given below:

$$A_1 = \frac{Q_0}{2\pi}, a_{91} = a_{51}, a_{92} = -a_{71} + a_{52}, a_{93} = -a_{72} + a_{53}, b_{21} = \frac{1}{a_{91}}, b_{22} = -\frac{a_{92}}{a_{91}^2}, b_{23} = \frac{a_{92}^2 - a_{91}a_{93}}{a_{91}^3},$$

$$d_{11} = b_{21}\tau_1, d_{12} = b_{21} + b_{22}\tau_1, d_{13} = b_{22} + b_{23}\tau_1,$$

$$b_{31} = a_{51}, b_{32} = a_{52} - \frac{1}{\tau_1}, b_{33} = a_{53} + \frac{1}{\tau_1^2}, h_{31} = (\lambda_1 - 1)a_{51}, h_{32} = (\lambda_1 - 1)a_{52} + \frac{1}{\tau_1}, h_{33} = (\lambda_1 - 1)a_{53} - \frac{1}{\tau_1^2},$$

$$R_{11} = a_{71} - \frac{1}{\tau_1}, R_{12} = a_{72} + \frac{1}{\tau_1^2}, R_{13} = a_{73} - \frac{1}{\tau_1^3},$$

$$h_{41} = (\lambda_1 - 1)a_{71} + \frac{1}{\tau_1}, h_{42} = (\lambda_1 - 1)a_{72} - \frac{1}{\tau_1^2}, h_{43} = (\lambda_1 - 1)a_{73} + \frac{1}{\tau_1^3},$$

$$b_{41} = \frac{1}{(a_{61})^{1/2}}, b_{42} = \frac{-a_{62}}{2(a_{61})^{3/2}}, b_{43} = -\frac{(-3a_{62}^2 + 4a_{61}a_{63})}{8(a_{61})^{5/2}},$$

$$b_{51} = \frac{1}{(a_{81})^{1/2}}, b_{52} = \frac{-a_{82}}{2(a_{81})^{3/2}}, b_{53} = -\frac{(-3a_{82}^2 + 4a_{81}a_{83})}{8(a_{81})^{5/2}},$$

$$b_{61} = \frac{1}{(a_{61})^{3/2}}, b_{62} = \frac{-3a_{62}}{2(a_{61})^{5/2}}, b_{63} = -\frac{3(-5a_{62}^2 + 4a_{61}a_{63})}{8(a_{61})^{7/2}},$$

$$b_{71} = \frac{1}{(a_{81})^{3/2}}, b_{72} = \frac{-3a_{82}}{2(a_{81})^{5/2}}, b_{73} = -\frac{3(-5a_{82}^2 + 4a_{81}a_{83})}{8(a_{81})^{7/2}},$$

$$b_{81} = \frac{1}{(a_{61})^{5/2}}, b_{82} = \frac{-5a_{62}}{2(a_{61})^{7/2}}, b_{91} = \frac{1}{(a_{81})^{5/2}}, b_{92} = \frac{-5a_{82}}{2(a_{81})^{7/2}}, b_{93} = -\frac{5(-7a_{82}^2 + 4a_{81}a_{83})}{8(a_{81})^{9/2}},$$

$$c_{11} = e^{-a_{62}r}b_{41}, c_{12} = e^{-a_{62}r}\left(b_{42} - \frac{b_{61}}{8r}\right), c_{13} = e^{-a_{62}r}\left(b_{43} - \frac{b_{62}}{8r} + \frac{9}{128r^2}b_{81}\right),$$

$$c_{21} = e^{-a_{62}r}b_{41}, c_{22} = e^{-a_{62}r}\left(b_{42} + \frac{3b_{61}}{8r}\right), c_{23} = e^{-a_{62}r}\left(b_{43} + \frac{3b_{62}}{8r} - \frac{15}{128r^2}b_{81}\right),$$

$$k_{31} = b_{51}, k_{32} = -ra_{82}b_{51} - \frac{b_{71}}{8r}, k_{33} = r^2a_{82}^2b_{51} + b_{52} + \frac{a_{82}b_{71}}{8} + \frac{9b_{91}}{128r^2},$$

$$k_{51} = b_{51}, k_{52} = -ra_{82}b_{51} + \frac{3b_{71}}{8r}, k_{53} = \frac{r^2a_{82}^2b_{51}}{2} + b_{52} - \frac{3a_{82}b_{71}}{8} - \frac{15b_{91}}{128r^2},$$

$$c_{51} = b_{31}c_{11}, c_{52} = b_{32}c_{11} + b_{31}c_{12}, c_{53} = b_{33}c_{11} + b_{32}c_{12} + b_{31}c_{13},$$

$$c_{61} = k_{31}R_{11}, c_{62} = k_{32}R_{11}, c_{63} = k_{33}R_{11} + k_{31}R_{12},$$

$$c_{71} = \frac{c_{51}b_{21}}{a_1}, c_{72} = \frac{c_{51}b_{22} + c_{52}b_{21}}{a_1}, c_{81} = -\frac{c_{61}b_{21}}{a_1}, c_{82} = -\frac{c_{62}b_{21}}{a_1},$$

$$g_{31} = -a_{61}b_{21}c_{21}, g_{32} = a_{61}b_{21}c_{21} + a_{61}b_{22}c_{21} + a_{61}b_{21}c_{22},$$

$$g_{34} = -a_{81}b_{21}k_{51}, g_{35} = -a_{81}b_{21}k_{52},$$

$$h_{11} = \frac{(1-\lambda_1)}{r}a_{61}b_{21}c_{21} + \frac{b_{21}c_{21}}{\tau_1},$$

$$h_{12} = \frac{(1-\lambda_1)}{r}\left((a_{62}b_{21} + a_{61}b_{22})c_{21} + a_{61}b_{21}c_{22}\right) + \left(\frac{b_{22}c_{11} + b_{21}c_{12}}{\tau_1} - \frac{b_{21}c_{11}}{(\tau_1)^2}\right),$$

$$\begin{aligned}
h_{13} &= \frac{(1-\lambda_1)}{r} ((a_{63}b_{21} + a_{62}b_{22} + a_{61}b_{23})c_{21} + (a_{62}b_{21} + a_{61}b_{22})c_{22} + a_{61}b_{21}c_{23}) \\
&+ \left(\frac{b_{23}c_{11} + b_{21}c_{12} + b_{21}c_{12}}{\tau_1} - \frac{b_{22}c_{11} + b_{21}c_{12}}{(\tau_1)^2} + \frac{b_{21}c_{11}}{(\tau_1)^3} \right), \\
h_{14} &= -\frac{b_{21}k_{31}}{(\tau_1)}, h_{15} = -\frac{(1-\lambda_1)}{r}a_{81}b_{21}k_{51} - \frac{b_{21}k_{32}}{(\tau_1)}, \\
h_{16} &= -\left[\frac{(1-\lambda_1)}{r}a_{81}b_{21}k_{52} - \frac{b_{21}k_{32}}{(\tau_1)^2} + \frac{b_{22}k_{31} + b_{21}k_{33}}{(\tau_1)} \right], \\
h_{21} &= h_{11}\tau_1, h_{22} = h_{11} + h_{12}\tau_1, h_{24} = h_{14}\tau_1, h_{25} = h_{15}\tau_1, \\
h_{51} &= h_{31}c_{11}, h_{52} = h_{31}c_{12} + c_{11}h_{32} + \frac{(\lambda_1-1)}{r}a_{61}c_{21}, \\
h_{53} &= h_{31}c_{13} + c_{12}h_{32} + h_{33}c_{11} + \frac{(\lambda_1-1)}{r}(a_{62}c_{21} + a_{61}c_{22}), \\
h_{54} &= -h_{41}k_{31}, h_{55} = -\left(h_{41}k_{32} + \frac{(\lambda_1-1)}{r}a_{81}k_{51} \right), \\
h_{56} &= -\left(h_{42}k_{31} + h_{41}k_{33} + \frac{(\lambda_1-1)}{r}a_{81}k_{52} \right), \\
h_{91} &= b_{21}h_{51}\tau_1, h_{92} = b_{21}h_{51} + (b_{22}h_{51} + b_{21}h_{52})\tau_1, \\
h_{94} &= b_{21}h_{54}\tau_1, h_{95} = b_{21}h_{55}\tau_1.
\end{aligned}$$

Appendix III:

Expressions of various notations used in chapter 6 are given below:

$$\begin{aligned}
c_{11} &= \tau_q, c_{12} = 1 - \tau_q a_0, c_{31} = \frac{1}{\sqrt{a_{41}}}, c_{32} = \frac{-a_{42}}{2(a_{41})^{\frac{3}{2}}}, c_{61} = \frac{1}{\sqrt{b_{41}}}, c_{62} = \frac{-b_{42}}{2(b_{41})^{\frac{3}{2}}}, \\
c_{81} &= (a_{41})^2 - (b_{41})^2, c_{82} = 2(a_{41}a_{42} + b_{41}b_{42}), c_{91} = \frac{1}{c_{81}}, c_{92} = \frac{-c_{82}}{c_{81}^2}, \\
d_{11} &= c_{11}c_{91}, d_{12} = c_{12}c_{91} + c_{11}c_{92}, d_{21} = (a_{41})^2 - 1, d_{22} = 2a_{41}a_{42}, \\
d_{31} &= (b_{41})^2 - 1, d_{32} = 2b_{41}b_{42}, d_{41} = c_{31}d_{21}, d_{42} = c_{32}d_{21} + c_{31}d_{22}, \\
d_{51} &= c_{61}d_{31}, d_{52} = c_{62}d_{31} + c_{61}d_{32}, d_{61} = d_{11}d_{51}, d_{62} = d_{12}d_{51} + d_{11}d_{52}, \\
d_{71} &= d_{11}d_{41}, d_{72} = d_{12}d_{41} + d_{11}d_{42}, \\
d_{81} &= d_{71}, d_{82} = d_{72}, d_{83} = -d_{61}, d_{84} = -d_{62}, \\
d_{91} &= a_{41}c_{31}, d_{92} = a_{42}c_{31} + a_{41}c_{32}, \\
f_{11} &= b_{41}c_{61}, f_{12} = b_{42}c_{61} + b_{41}c_{62} \\
f_{21} &= d_{11}d_{91}, f_{22} = d_{12}d_{91} + d_{11}d_{92}, f_{31} = d_{11}f_{11}, f_{32} = d_{12}f_{11} + d_{11}f_{12}, \\
f_{41} &= a_1f_{21}, f_{42} = a_1f_{22}, f_{43} = -a_1f_{31}, f_{44} = -a_1f_{32}, \\
g_{11} &= -\left(\frac{\lambda_1-1}{r}\right)a_{41}, g_{12} = -\left(\frac{\lambda_1-1}{r}\right)a_{42}, g_{21} = -\left(\frac{\lambda_1-1}{r}\right)b_{41}, g_{22} = -\left(\frac{\lambda_1-1}{r}\right)b_{42}, \\
g_{31} &= c_{31}, g_{32} = c_{32} + c_{31}g_{11}, g_{41} = c_{61}, g_{42} = c_{62} + c_{61}g_{21}, \\
g_{51} &= g_{31}d_{11}, g_{52} = g_{32}d_{11} + g_{31}d_{12}, g_{61} = g_{41}d_{11}, g_{62} = g_{42}d_{11} + g_{41}d_{12},
\end{aligned}$$

$$\begin{aligned}
g_{71} &= -g_{61}, g_{72} = -g_{62}, g_{81} = (\lambda_1 - 1)(a_{41})^2 + 1, g_{82} = (\lambda_1 - 1)(2a_{41}a_{42}) + \frac{a_{41}}{r}, \\
g_{91} &= (\lambda_1 - 1)(b_{41})^2 + 1, g_{92} = (\lambda_1 - 1)(2b_{41}b_{42}) + \frac{b_{41}}{r}, \\
h_{11} &= c_{31}g_{81}, h_{12} = c_{31}g_{82} + c_{32}g_{81}, \\
h_{21} &= c_{61}g_{91}, h_{22} = c_{61}g_{92} + c_{62}g_{91}, h_{31} = a_1d_{11}h_{11}, h_{32} = a_1(d_{12}h_{11} + d_{11}h_{12}), \\
h_{41} &= a_1d_{11}h_{21}, h_{42} = a_1(d_{12}h_{21} + d_{11}h_{22}), h_{51} = -h_{41}, h_{52} = -h_{42}.
\end{aligned}$$