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Effect of fractional order Klein-Gordon time-nonlocally on bioheat transfer in skin tissue exposed heat radiation

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In this research bioheat equation in fractional order Klein-Gordon time-nonlocally using Pennes' bioheat transfer equation in terms of partial differential equation is formulated. Heat transfer in tissues, skin and blood is termed as bioheat transfer which is essential for life process. When the skin is exposed to heat, skin tissues get damaged. There are many situations where bioheat treatment of skin and other disease is given such as skin cancer, skin burns and injured skin tissue with laser.

The modified Pennes' bioheat transfer equation due to laser radiation and the thermal damage in tissue caused due to laser heating has been examined. The thermal damages can be measured more accurately and in a better way with the fractional order model using Laplace transform technique.

Expression for the temperature and thermal damage in the skin exposed to heating with laser radiation is obtained. The effect of fractional order and non-locality parameter on the thermal reaction of skin tissues during laser radiation is studied and shown graphically.

Keywords: bioheat, fractional order derivative, Klein-Gordon time-nonlocality, Pennes' bioheat transfer equation

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