Thermoelastic Problems on Elliptical Objects with Internal Heat Source

In modern engineering applications, elliptical structures are extensively used due to the added advantage of combining the physical, mechanical, as well as thermal properties of different materials compared to other shape objects. Many of these applications require a detailed knowledge of transient temperature and heat-flux distribution within the elliptical objects. Things get further complicated when internal heat generation persists in the object under consideration and further becomes unpredictable when sectional heat supply is impacted on the body. Both analytical and numerical techniques are the best methodology to solve such problems. Nonetheless, numerical solutions are preferred and prevalent in practice, due to either unavailability or higher mathematical complexity of the corresponding exact solutions. Rather, limited use of analytical solutions should not diminish their merit over numerical ones; since exact solutions, if available, provide an insight into the governing physics of the problem, which is typically missing in any numerical solution. Moreover, analyzing closed-form solutions to obtain optimal design options for any particular application of interest.

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