

# Problems with fractional derivatives

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Fractional calculus goes beyond the classical calculus, allowing derivatives and integrals to be of any real or even complex order. In various problems, e.g. from viscoelasticity, fractional derivatives more accurately describe certain physical phenomena than integer order derivatives. Hence, fractional calculus is nowadays widely used in different fields of science such as physics, mechanics, engineering, finance, biology, chemistry, etc. Fractional derivatives can be introduced in equations of mathematical physics either by a direct 'fractionalization', i.e., by replacing integer order derivatives with derivatives of real order, or through the use of variational principles.

In this talk we present recent research on different problems involving fractional derivatives. In particular, we discuss variational problems with fractional derivatives, waves occurring in viscoelastic media, as well as Euler-Bernoulli beam models.