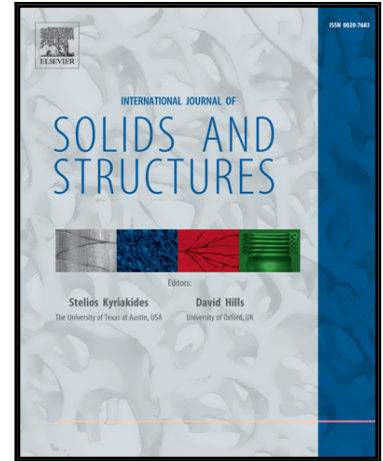


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Creep and relaxation Poisson's ratio: back to the foundations of linear viscoelasticity. Application to concrete.

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Abstract

Various scientific communities, mainly in concrete and polymer materials fields, have extended the definition of the Poisson's ratio to linear viscoelasticity. Depending on the authors, the viscoelastic Poisson's ratios can be increasing, decreasing or non-monotonic functions of time. Going back to the classic integral formulation of the linear viscoelastic behaviour, creep and relaxation Poisson's ratios are rederived as functions of bulk and shear relaxation or compliance functions. Both non ageing and ageing behaviours are considered. A literature survey on the thermodynamic restrictions on the viscoelastic characteristics shows that the ageing case has been much less studied than the non ageing case. Still, some examples, both theoretical, including in the ageing case, and practical, regarding concrete, are provided to highlight that any evolution of the viscoelastic Poisson's ratios is possible: increasing, decreasing and even non monotonous.

Keywords: Linear viscoelasticity, creep, relaxation, Poisson's ratio, concrete

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