



UNIVERSITÀ DEGLI STUDI
DI TRENTO

Dipartimento di Ingegneria Civile,
Ambientale e Meccanica



Instabilities and nonlocal
multiscale modelling of
materials

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AVVISO DI SEMINARIO

Si comunica che **venerdì 16 marzo 2018 a partire dalle ore 10.00**
si terrà presso l'aula **C2** (via Mesiano 77) il seguente seminario

Mathematical modelling of crack propagation in human bone

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The problem of crack propagation in human bone is studied. We formulate and solve the mathematical problem for pre-stressed cracked human bones, regarded as pre-stressed elastic composites. Using the theories of Guz and Muskhelishvili's formalism, we determine the incremental fields in an initially deformed orthotropic elastic composite with cracks.

The presented 2D quasistatic mathematical model provides a means to find crack propagation angle for a crack in human bone, regarded as orthotropic materials with initial fields. Using generalized Sih's strain energy density generalized and maximum stress criteria we find the direction of the crack path, as well as the critical values which produces crack propagation.

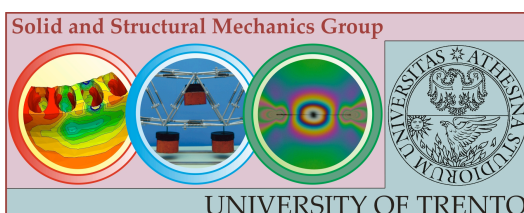
Future numerical results or experimental tests have to confirm or not that our study, in the case of small over great strains, regarding generalization of Sih's criteria is valid.

References

1. Bigoni D. Nonlinear Solid Mechanics Bifurcation Theory and Material Instability. Cambridge University Press, 2012.
2. Cowin, S.C. et all, Properties of bone in Handbook of Bioengineering, McGraw- Hill, New York, 1987
3. Cristescu, N., Craciun, E.M. and Soos, E., Mechanics of Elastic Composites, CRC Press, Chapman & Hall, 2004
4. Erdogan, F., Sih, G.C., On the crack extension in plates under plane loading and transverse shear, ASME, J. Basic. Eng. **85**, p. 519-525, 1963.

Tutti gli interessati sono invitati a partecipare.

Il seminario è organizzato dal gruppo di Scienza delle Costruzioni
(D. Bigoni, L. Deseri, N.Pugno, M. Gei, A. Piccolroaz, F. Dal Corso, M.F. Pantano, R. Springhetti)



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