SEMINAR

APPLIED MATHEMATICS AND MECHANICS

FS929

27 February 2018

A DCAMM seminar No. 719 will be presented by

Postdoctoral Researcher Lars Edvard Dæhli
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The title of the lecture is

A Lode-dependent porous plasticity model motivated by unit cell analyses

Abstract:

Unit cell simulations have shown that the third invariant of the stress deviator has a marked effect on the evolution of the porosity. In this study, a modified Gurson model is proposed to include this effect based on unit cell simulations and strain localization analyses. A cubic unit cell with a spherical void located at the centre was modelled by finite elements assuming an elastic-plastic matrix material governed by J2 flow theory. The unit cell simulations exhibit a monotonic decrease in the void growth when the stress state changes from generalized axisymmetric tension via generalized shear to generalized axisymmetric compression for moderate and high levels of stress triaxiality. The Gurson model is then modified by including a term in the void evolution rule that accounts for Lode dependence in a similar manner as proposed by Nahshon and Hutchinson (2008). The modified Gurson model is assessed qualitatively through comparison with the unit cell simulations and strain localization analyses using an imperfection band approach. It is found that the modified Gurson model compares well with the unit cell results. Further, the imperfection band analyses show that the modified Gurson model gives a larger difference between the failure strain levels in generalized axisymmetric tension and compression than the original Gurson model and the shear-modified Gurson model of Nahshon and Hutchinson (2008). The Lode-dependent void evolution rule gives ductility predictions that are in qualitatively good agreement with previously reported studies based on unit cell simulations.

DATE:	**Thursday, 8 March 2018**
TIME:	**14:00 – 14:45 + questions**
PLACE:	**Room 025, Building 414,** DTU, Technical University of Denmark

Danish pastry, coffee and tea will be served 15 minutes before the seminar starts.

All interested persons are invited.

Niels Leergaard Pedersen

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