



ESAFORM Webinar Series 2024

Isotropic and anisotropic plasticity

Prof. Frédéric Barlat

IRDL Institute, University of South Brittany, Lorient, France
Pohang University of Science and Technology, Republic of Korea

Date/time: 24th July 2024 / 15:00 CET Registration link, to attend the meeting:

https://videoconf-colibri.zoom.us/meeting/register/tJludeiupj4vGtQkYKZcRj6m5Mb9zi_-9vXd

Abstract

In this presentation, the description of constitutive relationships for the plasticity of metals is reviewed. This is mostly about the yield condition which, with a few assumptions, is sufficient to completely define the plastic behavior of a continuum point. After a brief introduction, the discussion splits into two main sections: 1) isotropic and anisotropic plasticity under isotropic hardening and; 2) anisotropic hardening. In the latter, the emphasis is put on distortional plasticity. Finally, a brief introduction of the finite element (FE) implementation with a recently developed non-iterative stress integration approach is explained [1]. The results of the forming simulation of a B-pillar made of a TRIP 1180 steel sheet is shown for application purpose and to prove the robustness of a distortional plasticity model and its FE implementation.

[1] Yoon, S.Y., Barlat, F., 2023. Non-iterative stress projection method extended to anisotropic hardening models. *Mech. Mater* 183, 104683. doi:10.1016/j.mechmat.2023.104683

Biography

Professor Barlat received a PhD in Mechanics from the Grenoble Institute of Technology, France, in 1984. The same year, he joined Alcoa Technical Center near Pittsburgh PA, the research facility of Alcoa, where he conducted scientific research on aluminum technologies for more than 20 years. In 2007, he joined the Pohang University of Science and Technology (POSTECH) in the Republic of Korea as a Full Professor. He is currently an Emeritus Professor at POSTECH, and an Invited Researcher at the University of South Brittany in Lorient, France. Professor Barlat is also a Visiting Professor of the Institute of Global Innovation Research at Tokyo University of Agriculture and Technology (TUAT) since 2016.



Professor Barlat research focuses on the development of innovative plasticity theories for metals as well as manufacturing technologies for metal products. Over his entire career, he has published over 300 articles in peer-reviewed scientific journals and book chapters. He received many awards, in particular, the 2013 Khan International Award for outstanding life-long contributions to the field of Plasticity. In 2016, he was elected by the Romanian Academy as an honorary member.