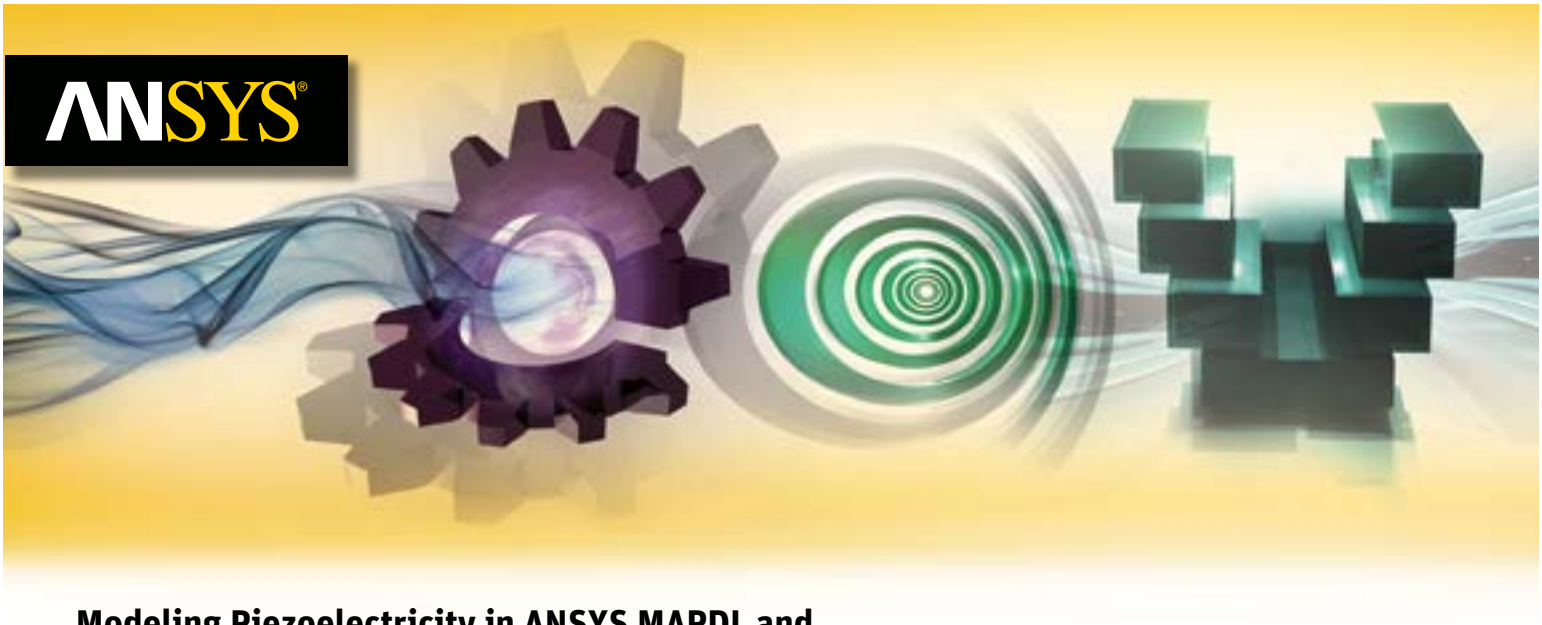


Modeling Piezoelectricity in ANSYS MAPDL and ANSYS Mechanical

Piezoelectricity is the ability of certain crystalline materials to generate an electric charge proportional to a mechanical strain (direct piezoelectricity). Direct piezoelectricity was discovered by Pierre and Jacques Curie in 1880 when they were studying the effect of pressure on natural single crystal structures such as tourmaline, quartz, topaz, and Rochelle salt. Converse piezoelectricity is rather the ability to generate mechanical strain in response to an applied electric charge. Piezoelectric stack actuators are a good example of this converse effect. They are increasingly used in micro-positioning applications due to their precision and responsiveness.

Since ANSYS Workbench has been released, the question of whether piezoelectricity can be modeled in workbench has been very popular. Thanks to 'command snippets' that made it possible to use APDL commands to convert a certain part of your model to piezoelectric element (PLANE223, SOLID226, or SOLID227), and assign piezoelectric properties to it. Although this has been a fantastic feature, it was not really pleasant to non-APDL users.

Now, with the release of the "for free" Piezo ACT extension (works with R14.5 and later versions), modeling piezoelectricity in Mechanical couldn't have been easier.

This seminar will be divided into two parts. In the first part, we will quickly introduce the theory of piezoelectricity and its constitutive equations. We will also focus on piezoelectric material properties and how they can be introduced and converted to ANSYS convention. In the second part of the seminar demoes will be shown to demonstrate the use of both "command snippets" and "ACT extension" to model piezoelectricity in ANSYS Mechanical.

Location: Ann Arbor, MI

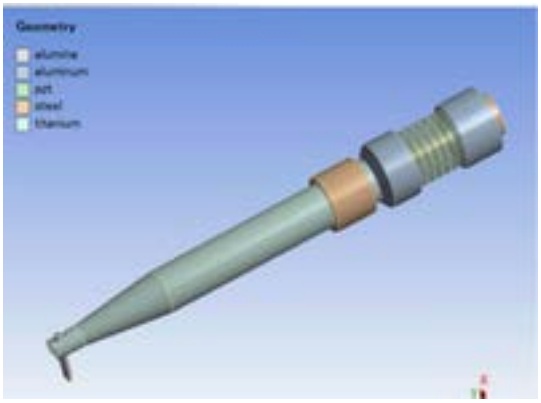
Date: November 12, 2013

Part 1: Theory/Background - 10:30 AM - 12:00 PM
Lunch: 12:00 PM - 1:00 PM
Part 2: FEA Examples - 1:00 PM - 2:30 PM

Venue:
ANSYS, Inc.
900 Victors Way
Atrium One
Suite 350
Ann Arbor, MI 48108

Cost: **Free - Space is limited.**

Register Now



PIEZOELECTRIC WIREBOND ASSEMBLY