

Piezoelectricity Week 5b Piezoelectricity Experiments Spring 2016

The pre-amplifier circuit is from the reference:

R. M. Mottola, "Constructing an Under Saddle Transducer," web page:
<http://www.liutaiomottola.com/PrevPubs/Piezo/CoaxTransducer.htm>

For the bimorph first use as a capacitor (65nFd) and if needed use piezoelectronic equations. For meaning of constants see the **PI** Ceramic web page:
http://www.piceramic.com/piezo_effects3.php

For the piezoelectric transformer use the equivalent circuit given by STEMiNC.

1. Run Spice and construct the FET pre-amplifier (guitar pick-up circuit of the paper
2. Use input signals from
 - a) the signal generator over a wide frequency range,
 - b) the piezoelectric bimorph actuator [STEMiNC SMBA4510T05M of "property SM311"] pressed and pulsed
 - c) the single layer piezoelectric (Rosen) transformer [STEMiNC SMSTF68P1059] fed by
 - i. the signal generator
 - ii. the piezoelectric bimorph actuator
 - iii. pulsed at either input or output section .
3. Investigate the different things which can be measured
4. Check how this works with a PVDF cable (note comment of bottom of page 6 of the paper listed above).
5. The bimorph could possibly be used similarly to quartz in oscillators. For that use the equivalent circuit {right top of the above PI web page or Sedra & Smith [page 1353, 6th edition]} by making a frequency plot and equating coefficients in a matching curve.