Implementation of extensometer calibration and decimation filtering on Campbell Scientific CR10X datalogger

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A b s t r a c t : The quartz tube extensometer and associated electronics at the Vyhne tidal station operate in very unfriendly conditions of 100% humidity, which causes corrosion of metal parts (suspensions, wirings etc.), often leading to disturbances or complete dropouts of measurements.

Response of the instrument to the regular calibration pulses serves not only proper scaling of the output and easy orientation in the data stream but also the diagnostics of health of the system and the discrimination of disturbed (thus not suitable for geophysical interpretation) portions of the signal.

On the other hand, the calibration pulses themselves *disturb in some extent* the standard measurements, too. To minimize the extent of influence of the calibration switched on on standard data (and calibration switched off on calibration data) is, when one has to confine himself to the meager instruction set of the Campbell Scientific CR10X datalogger, an interesting engineering task.

Key words: quartz tube extensometer, calibration, CR10X datalogger, time multiplex, decimation, finite impulse response filter design

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