DE-NOISING SIGNAL OF THE QUARTZ FLEXURAL ACCELEROMETER BY MULTIWAVELET SHRINKAGE

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Abstract- Methods of de-noising the output signal of the JSD-I/A quartz flexural accelerometer based on five types of multiwavelets are comparatively investigated in this paper. Firstly, the theory of multiwavelet transform and the generalized cross validation criterion are analyzed. Secondly, because the JSD-I/A quartz flexural accelerometer which is fixed in SCT-1 two-axis rotation platform by the appropriative clamp has a start-up procedure of 3 minutes, the output signal of the quartz flexural accelerometer are sampled after applying the voltage for 5 minutes. Thirdly, based on the soft threshold function and the universal threshold, GHM orthogonal multiwavelet, SA4 orthogonal multiwavelet, CL orthogonal multiwavelet, Cardbal2 balanced multiwavelet and BIGHM biorthogonal multiwavelet are applied to de-noise the sampled signal of the JSD-I/A quartz flexural accelerometer with 4 decomposition level, respectively. Lastly, the generalized cross validation criterion is used to evaluate the de-noising effects of the above five multiwavelets. The

experimental results shows that the generalized cross validation value of BIGHM biorthogonal multiwavelet is effective in de-nosing the the output signal of the JSD-I/A quartz flexural accelerometer, and offer the best performance than GHM orthogonal multiwavelet, SA4 orthogonal multiwavelet, CL orthogonal multiwavelet and Cardbal2 balanced multiwavelet.

Index terms*:* GHM orthogonal multiwavelet, SA4 orthogonal multiwavelet, CL orthogonal multiwavelet, Cardbal2 balanced multiwavelet, BIGHM biorthogonal multiwavelet, generalized cross validation, JSD-I/A quartz flexural accelerometer.