Signal, Image and Video Processing 2012 vol.8 N8, pages 1517-1532

NIMRAD: novel technique for respiratory data treatment

Nigmatullin R., Ionescu C., Baleanu D.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

© 2012, Springer-Verlag London. This paper illustrates the efficiency and simplicity of a new technique which is determined in this paper as NIMRAD (the non-invasive methods of the reduced analysis of data) for describing information extracted from biological signals. As a specific example, we consider the respiratory data. The NIMRAD can be applied for quantitative description of data recorded for complex systems in cases where the adequate model is absent and the treatment procedure should not contain any uncontrollable error. The theoretical developments are applied to signals measured from the respiratory system by means of the forced oscillation technique based on non-invasive lung function test. In order to verify the feasibility of the proposed algorithm for developing new diagnosis tools, we apply NIMRAD on two different respiratory data sets, namely from a healthy subject and from a patient diagnosed with asthma. The results are promising and suggest that NIMRAD could be further tailored and used for specific clinical applications.

http://dx.doi.org/10.1007/s11760-012-0386-1

Keywords

Asthma diagnosis, Non-invasive data treatment methods, Respiratory impedance