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**Yuesheng Xu** and **Liang Zhao\*** (lzhao04@syr.edu), Carnegie 215, Syracuse University, Syracuse, NY 13210. *Filter-Based Multiscale Entropy Analysis of Complex Physiologic Time Series.*

The multiscale entropy analysis has been widely used to analyze the complexity of physiologic time series, such as heart rate. To better capture the multiscale information from different physiologic time series, we introduce a filter-based multiscale entropy method providing more flexibility to study the complexity of a given time series carried at different scales. The original time series is passed through desired fine-to-coarse filters at different scales and an entropy value is calculated at each scale according to the structure of the filtered time series. We apply it to the human heartbeat interval time series with piecewise linear filter motivated by the heart rate turbulence theory. The results on different lengths of data consistently indicate the loss of complexity with aging and some pathologic conditions. We find that aging may reduce the complexity of the cardiac system more than some certain diseases. Moreover, the results also separate healthy and pathologic groups very well, suggesting diagnostic uses. (Received September 23, 2012)