Appendix 2

Evaluation of S and S_-, and therefrom ΔS_i, when a window of length i is sliding through a time-series

The value of S (and S_-) calculated for a number of successive pulses varies within the ECG recording, i.e., when using a time-window of length i sliding, each time by one pulse, through the whole time-series. Thus, for a window of length i, when starting from the m_0-th pulse, we have

$$S(m_0, i) = \langle \chi \ln \chi \rangle_w - \langle \chi \rangle_w \ln \langle \chi \rangle_w, \tag{1}$$

where

$$\langle \chi \ln \chi \rangle_w = \sum_{k=1}^{i} p_{k,w} \chi_{k,w} \ln \chi_{k,w},$$

$$\langle \chi \rangle_w = \sum_{k=1}^{i} p_{k,w} \chi_{k,w}$$

with

$$p_{k,w} = \frac{Q_{m_0-1+k}}{\sum_{n=1}^{i} Q_{m_0-1+n}} \tag{2}$$

and $\chi_{k,w} = k/i$. Similarly, $S_-(m_0, i)$ is calculated by Eq.(1) when $p_{k,w}$ of Eq.(2) is substituted by

$$\mathcal{T} p_{k,w} = Q_{m_0+i-k} / \sum_{n=1}^{i} Q_{m_0-1+n}.$$

The time series of ΔS_i is obtained by the differences $\Delta S_i(m_0) \equiv S(m_0, i) - S_-(m_0, i)$, $m_0 = 1, 2, \ldots N - i$ and its variation is quantified by its standard deviation

$$\sigma[\Delta S_i] \equiv \sqrt{\mathrm{V}ar[\Delta S_i]},$$

where

$$\mathrm{V}ar[\Delta S_i] = \mathrm{E}\left\{[(\Delta S_i - \mathrm{E}(\Delta S_i)]^2\right\}. \tag{3}$$

In Eq.(3), the symbol $\mathrm{E}(\ldots)$ stands for the average obtained when all the $N - i$ values (cf. $m_0 = 1, 2, \ldots N - i$) of its argument are considered.