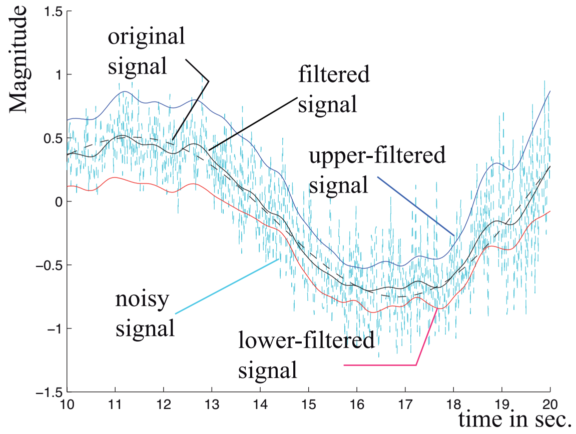

Figure 7: Imprecise signal filtered with the symetric Choquet (Sipos) integral based approach.

Gaussian filter. Within our approach, we use this knowledge to construct, for each sample of the signal to be filtered, a 60% confidence interval. We thus construct an interval-valued noisy signal that should contain 60% of the real values of the original signal. Figures **??** and **??** show a zoomed window of the result of this experiment. The color coding used in Figures **??** and **??** is the same than in Figures **??** and **??**. The Šipoš -based filtered signal is included in the Choquet-based filtered signal (the Šipoš -based filtered signal is represented in dotted lines in Figure **??**). All the remarks done in the first part of the experiment (with the precise signal) still hold with the second part of the experiment, except that, since the noise is accounted by the interval-valued input, the original signal fully belongs to the interval-valued outputs, for both approaches.

7. Conclusion

In this paper, we have proposed two extensions of the imprecise-valued filtering method we have previously proposed in [**?**]. This method allows representing a partial lack of knowledge about the impulse response of the filter to be used. It consists in replacing the classical single precise impulse response by a set of impulse responses that is consistent with the user's expert knowledge. The set of impulse responses is represented by a concave capacity and the aggregation operator used in linear filtering is replaced by a Choquet integral. Due to these replacements, the computational complexity of this new approach is comparable to the complexity of the classical approach. The first extension concerns the use of the Šipoš integral. This extension leads to a filtering approach that achieve a kind of compensation between positive and negative part of the signal. The obtained signal is thus more specific near a nominal equilibrium point than the previous approach proposed in [**?**]. The second extension allows the use of the imprecise filtering approach with imprecise inputs. In fact, the input of a filter can be imprecise either because this signal is the output of another imprecise filter (and thus it allows iterative filtering methods), or because this imprecision accounts for a known (calibrated) imprecision or for imprecision due to quantification.

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