



Figure 8. Instantaneous frequency of HHT in case of open-circuit fault of switches at K_1 and K_2

Figure 8 shows that the instantaneous frequency ($f_{shl}=50$ Hz) is the frequency that characterizes the open-circuit fault of the IGBT.

4. CONCLUSIONS

In this paper, a method for diagnosing and detecting the harmonic characteristic of the open-circuit fault of an IGBT of the two-stage three-phase inverter supplying an induction motor is proposed. This diagnostic method is based on the Hilbert-Huang transform to identify the instantaneous frequency that allows us to detect the frequency characterizing the open-circuit fault of the IGBT. This paper study is based on the extraction of the IMF for the healthy and the IGBT open-circuit fault cases by using the algorithm (CEEMDAN). To detect the open-circuit faults related to the resulting IMF, the Hilbert spectral envelope are conducted to identify the instantaneous frequency. This instantaneous frequency is the frequency characterizing the open-circuit fault of the IGBT. The method proposed is more efficient and more sensitive to the early detection and the diagnosis of open-circuit fault of the IGBTs of the inverter when compared to the conventional methods for example the wavelet or the STFT. The various results obtained are validated by several experimental works carried out in the LDEE laboratory by the diagnostic group to assess the effectiveness and the merits of the proposed HHT approach.

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