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Correction

Correction: Zhang D. Operation of AC Microgrids with PV Panels' Output Power Curtailment for Minimizing the Use of Energy Storage. *Journal of Energy and Power Technology* 2022; 4: 008

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The author wishes to make the following corrections to the paper [1]. The results shown in Figure 5 through Figure 8 in the paper are based on the corrected formulas and expressions.

Replace:

The design of the control parameters K_p, K_i and K for the inverter is accomplished by using Eqns. (4) through (10) derived from the control flow in Figure 4a and Figure 4b.

$$\frac{i_{2abc}}{\Delta i^*_{2abc}} = \frac{K \cdot (sC_1) \cdot (sR_dC_1 + 1) \cdot BPFilterDen}{DEN1 + DEN2 + DEN3 + DEN4 + DEN5} \tag{4}$$

where

$$DEN1 = [sC_1 \cdot (sL_2 + R_2) + (sR_dC_1 + 1)] \cdot (sL_1 + R_1) \cdot BPFilterDen \cdot sC_1 \tag{5}$$

$$DEN2 = K \cdot BPFilterNum \cdot sC_1 \cdot [sC_1 \cdot (sL_2 + R_2) + (sR_dC_1 + 1)] \tag{6}$$

$$DEN3 = (sR_dC_1 + 1) \cdot BPFilterDen \cdot [sC_1 \cdot (sL_2 + R_2) + (sR_dC_1 + 1)] \tag{7}$$

$$DEN4 = K \cdot BPFilterNum \cdot sC_1 \cdot (sR_dC_1 + 1) \tag{8}$$

$$DEN5 = BPFilterDen \cdot (sR_dC_1 + 1)^2 \tag{9}$$

For notch-filter based bandpass filter,

$$BPFilterNum = k_d \cdot b_n s \tag{10}$$

$$BPFilterDen = s^2 + b_n s + \omega_m^2 \tag{11}$$

For lowpass plus highpass filter,

$$BPFilterNum = k_d \cdot s \cdot LPCoeff2 \tag{12}$$

$$BPFilterDen = (s + HPCoeff) \cdot (s^2 + LPCoeff1 \cdot s + LPCoeff2) \tag{13}$$

The capacitor current active damping is considered by applying k_d as shown in (10) and (12).
For the closed-loop transfer function, one can use Matlab command to work it out. That is to say

$$\frac{i_{2abc}}{i^*_{2abc}} = feedback\left(\frac{i_{2abc}}{\Delta i^*_{2abc}}, Low\ Pass\ Filter\right) \tag{14}$$

where the lowpass filter is the second order butterworth filter with a cut-off frequency of switching frequency 5 kHz, which can be slightly higher. In practice, the function of such a filter can be replaced by choosing small K_p in proportional resonant controller as small K_p can reduce the influence of DC component in i_2 and PR controller can also effectively remove high-frequency noise in i_2.

with:

The design of the control parameters K_p, K_i and K for the inverter is accomplished by using Eqns. (4) through (10) derived from the control flow in Figure 4a and Figure 4b.

$$\frac{i_{2abc}}{i^*} = \frac{K \cdot (sC_1) \cdot (sR_dC_1 + 1) \cdot BPFilterDen}{DEN1 + DEN2 + DEN3 + DEN4 + DEN5} \tag{4}$$

where

$$DEN1 = [sC_1 \cdot (sL_2 + R_2) + (sR_dC_1 + 1)] \cdot (sL_1 + R_1) \cdot BPFilterDen \cdot sC_1 \tag{5}$$

$$DEN2 = K \cdot BPFilterNum \cdot sC_1 \cdot [sC_1 \cdot (sL_2 + R_2) + (sR_dC_1 + 1)] \tag{6}$$

$$DEN3 = (sR_dC_1 + 1) \cdot BPFilterDen \cdot [sC_1 \cdot (sL_2 + R_2) + (sR_dC_1 + 1)] \tag{7}$$

$$DEN4 = -K \cdot BPFilterNum \cdot sC_1 \cdot (sR_dC_1 + 1) \tag{8}$$

$$DEN5 = -BPFilterDen \cdot (sR_dC_1 + 1)^2 \tag{9}$$

For notch-filter based bandpass filter,

$$BPFilterNum = k_d \cdot b_n s \tag{10}$$

$$BPFilterDen = s^2 + b_n s + \omega_m^2 \tag{11}$$

For lowpass plus highpass filter,

$$BPFilterNum = k_d \cdot s \cdot LPCoeff2 \tag{12}$$

$$BPFilterDen = (s + HPCoeff) \cdot (s^2 + LPCoeff1 \cdot s + LPCoeff2) \tag{13}$$

The capacitor current active damping is considered by applying k_d as shown in (10) and (12). For the closed-loop transfer function, one can use Matlab command to work it out. That is to say

$$\frac{i_{2abc}}{i_{2abc}^*} = feedback\left[\frac{i_{2abc}}{i^*} \times \left(K_p + \frac{K_i s}{s^2 + \omega_0^2}\right), Low\ Pass\ Filter\right] \tag{14}$$

where the lowpass filter is the second order butterworth filter with a cut-off frequency of switching frequency 5 kHz, which can be slightly higher. In practice, the function of such a filter can be replaced by choosing small K_p in proportional resonant controller as small K_p can reduce the influence of DC component in i_2 and PR controller can also effectively remove high-frequency noise in i_2.

Competing Interests

The author has declared that no competing interest exists.

References

1. Zhang D. Operation of AC microgrids with PV panels' output power curtailment for minimizing the use of energy storage. J Energy Power Technol. 2022; 4: 008.