Université du Québec
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DSP-BASED QUASI-LINEAR CONTROL OF A 1.5 kW THREE-PHASE THREE-LEVEL BOOST-TYPE THREE-PHASE VIENNA RECTIFIER

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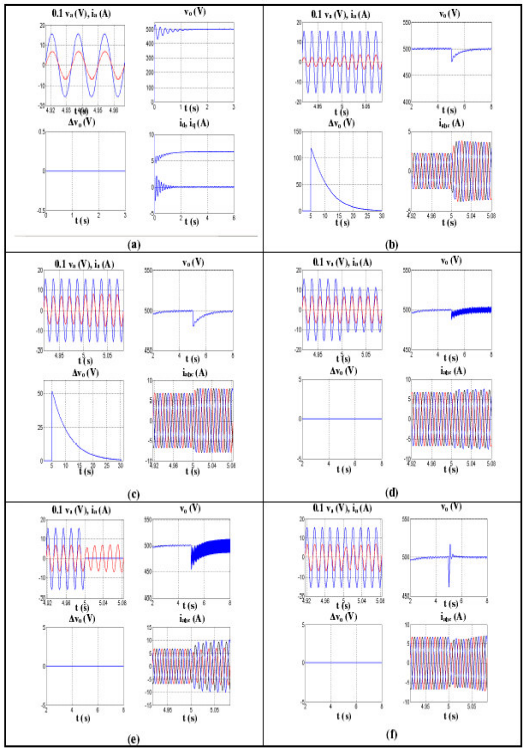
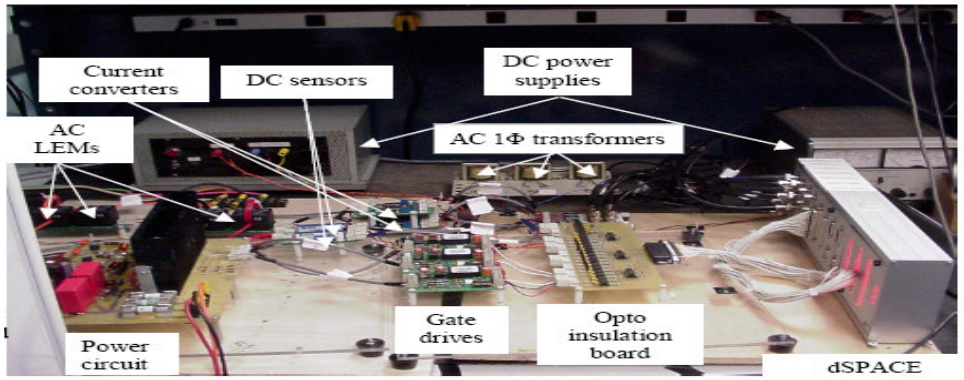


Fig. 4: Simulation results; (a): steady state, (b, c): R_{sd} step change respect. 300 % R_{sdn} ⇔ 100 % R_{sdn}, R_{sd} = 100 % R_{sdn} ⇔ 60% R_{sdn}, (d): 27 % v_s dip, (e) : phase a disconnexion, (f) : 500 % line impedance increase.



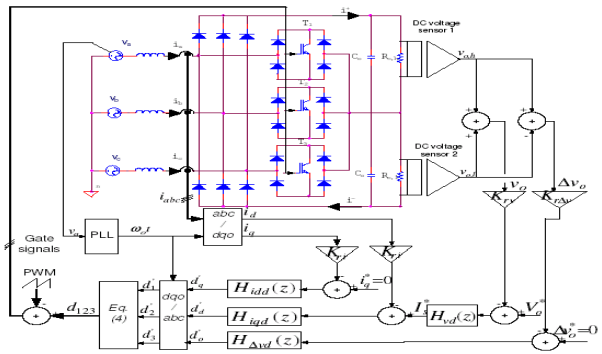


Fig. 5: Control scheme implementation block diagram

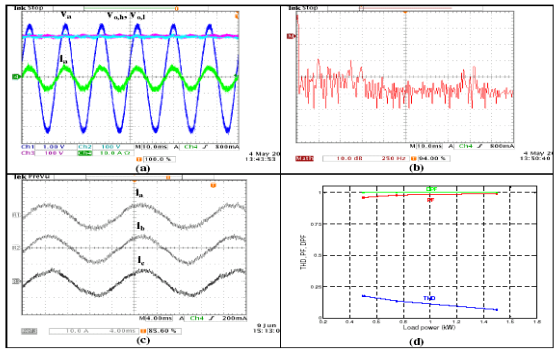


Fig. 7: Experimental results in steady state;
(a): phase a voltage and current, output DC voltages, (b): harmonic spectrum of current i_a,
(c): Three-phase currents, (d): THD, PF and DPF variation with output load power.

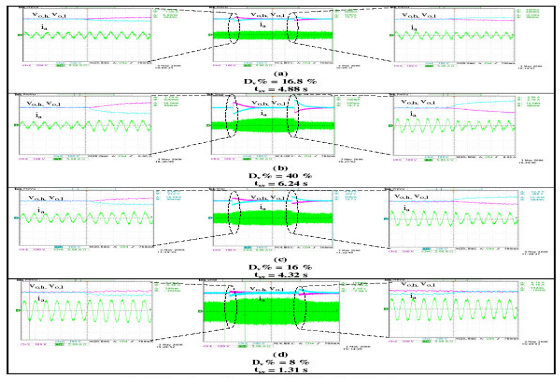


Fig. 8: Experimental results for low-level load step change;
(a): R_{sd} = 300 % R_{sdn} ⇔ 200 % R_{sdn} (b): R_{sd} = 300 % R_{sdn} ⇔ 100 % R_{sdn}
(c): R_{sd} = 200 % R_{sdn} ⇔ 100 % R_{sdn} (d): R_{sd} = 100 % R_{sdn} ⇔ 60 % R_{sdn}

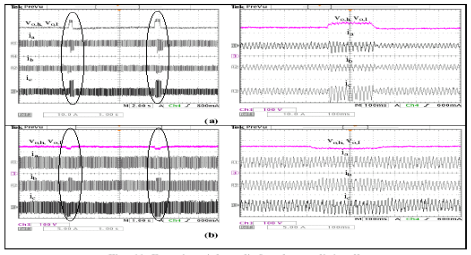


Fig. 11: Experimental results for phase a dip/swell,
(a): 27 % v_{sa} dip, (b): 27 % v_{sa} swell

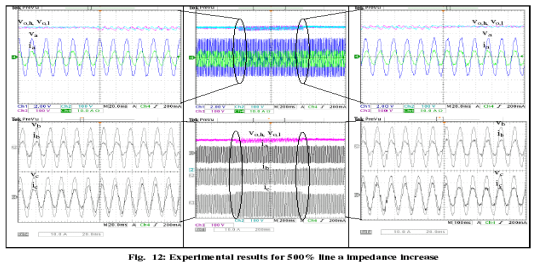


Fig. 12: Experimental results for 500 % line a impedance increase

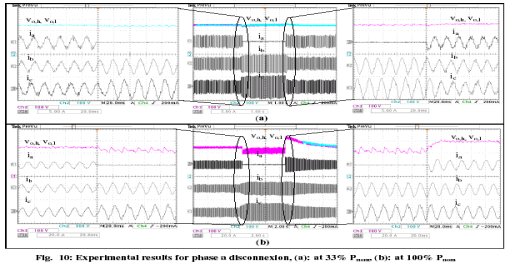


Fig. 10: Experimental results for phase a disconnexion, (a): at 33% P_{nom}, (b): at 100% P_{nom}

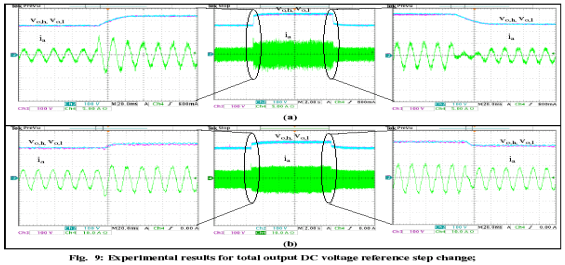


Fig. 9: Experimental results for total output DC voltage reference step change;
(a): V_o^*= 560V ⇔ 700V at 33% P_{nom}, (b): V_o^*= 560V ⇔ 600V at 100 % P_{nom}