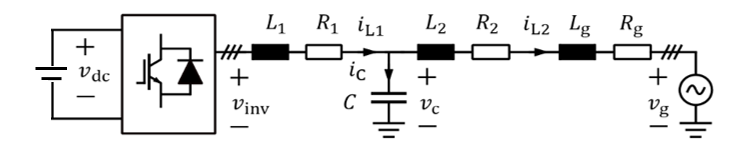
## **PR Current control with PLL effect**

## **System Configuration**



In the following, the superscript ‘’s’’ stands variables in system frame, while ‘’c’’ represents variables in control frame synchronized by PLL.

## **Current Control**

**Controller output**

(1)

**Modulator delay**

Pade1 formula is considered.

(2)

Where

**PR Controller**

Complex transfer function of PR controller in the -frame

(3)

Based on the frequency translation, complex transfer function of PR controller in the -frame

(4)

Equivalent transfer matrix of PR controller in the -frame

(5)

**Active damping**

(6)

## **LCL Filter**

(7)

(8)

## **Phase-Locked Loop (PLL)**

**PI Controller of PLL**

(9)

**Small-signal model of PLL**

(10)

**PLL effect**

(11)

(12)

## **Substitution**

**Current controller**

Linearizing (1)

(13)

Substituting (8) (11) (12) to (13)

(14)

Rearranging (14)

(15)

**LCL filter**

Linearizing (7)

(16)

Substituting (15) to (16)

(17)

## **Impedance model**

Rearranging (18)

(19)

(20)