In this method, the plant is split into two parts $G_n(s)$ and $G_d(s)$. The steady state gain from reference $r(t)$ to output $y(t)$ is given by $G_n(s)$. The condition to be satisfied by the design parameters are:

1. The steady state gain from $r(t)$ to $y(t)$ must be unity gain i.e. $P_{des}(0)G_{noi}(0) = 1$. This condition is required so that the steady state reference equals the actual reference: $y_p(t) = r(t)$.
2. The feed-forward transfer function:
   
   $FF1 = P_{des}(s)G_{noi}(s)$, $FF2 = P_{des}(s)G_d^{-1}(s)$ must be proper.

The conclusion drawn from the second condition is that $P_{des}(s)$ is stable and the relative degree of $P_{des}(s)$ is greater than or equal to the relative degree of $G_d(s)$.

For these systems, pole-zero cancellation can make the plant a minimum phase system. In particular, $P_{des}(s)G_{noi}(s)$ determines the class of signal that has to be perfectly tracked and $P_{des}(s)G_d^{-1}(s)$ determines the associated feed-forward control signal to achieve perfect tracking.

Since, adaptive PI control is used, the equations for the proportional gain $K_p$ and integral gain $K_i$ are obtained as:

\[
K_p = -\gamma \varepsilon y_1 \quad \text{where } \gamma > 0 \text{ is the adaption gain,}
\]

\[
K_i = -\gamma \varepsilon y_2
\]

For the following parameters: $L_1 = 1 \mu H$, $L_2 = 25 \mu H$, $C_1 = 1 \mu F$, $C_2 = 75 m F$, $R = 5$ and duty cycle of $70\%$, the control to output transfer function of inverter for positive and negative half cycles respectively are:

\[
G_d^+(s) = \frac{-s + 6.8207(s^3 + 0.1969s^2 + 3.7752s + 0.2008)}{s^4 + 0.0236s^3 + 10.96s^2 + 0.0701s + 0.0005}
\]

\[
G_d^-(s) = \frac{-s + 6.2520(s^3 + 0.1433s^2 + 1.6553s + 0.2191)}{s^4 + 0.0236s^3 + 10.96s^2 + 0.0701s + 0.0005}
\]

The design parameter is given as: $P_{des}(s) = \frac{k}{s^2 + 1}$ where $k$ depends on the non-minimum phase part of system.

References