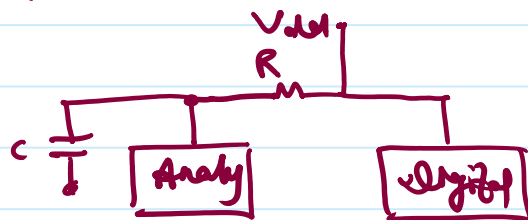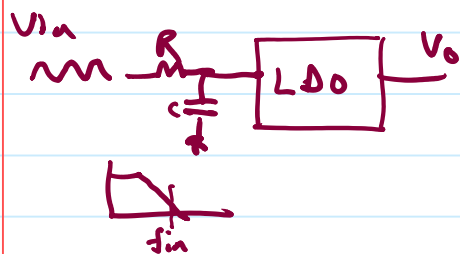# PSSR Improvement Techniques

1. Make output pole as dominant pole
2. If EA o/p pole dominant then increas b/w
3. EA with high gain
4. Filter supply noise
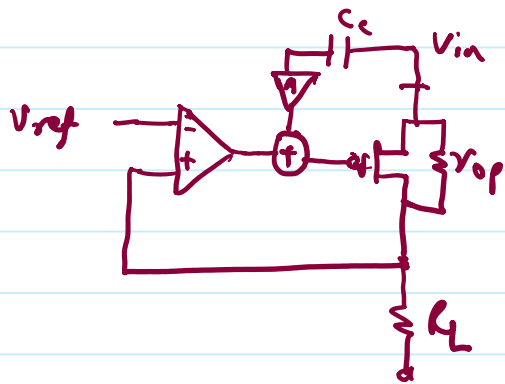

or LC filter

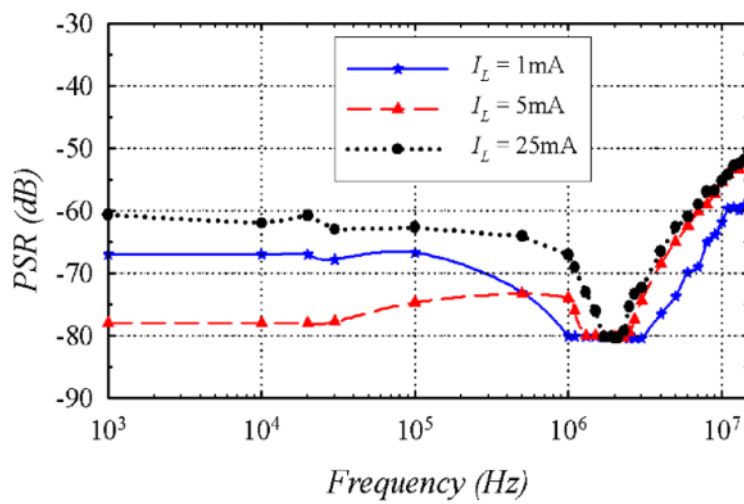5. Cascading LDOs

$$PSRR = PSRR_1 + PSRR_2 \ (dB)$$
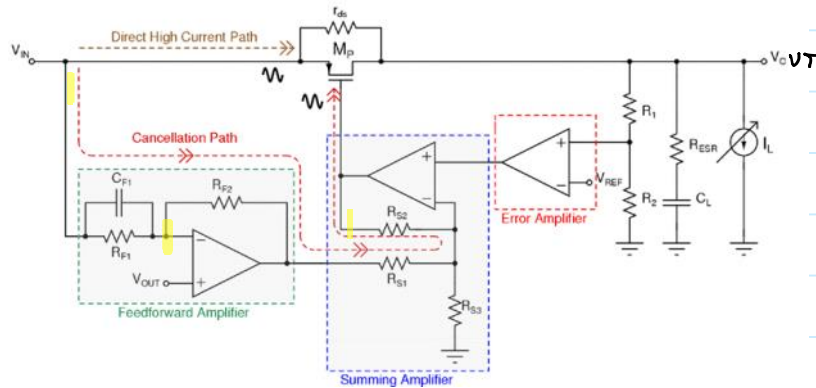
\# Poor efficiency

\# Expensive

PSSR Improvement Techniques

Feed-Forward Noise Cancellation

> M. El-Nozahi, A. Amer, J. Torres, K. Entesari, and E. Sánchez-Sinencio, "LDO with Feed forward Ripple Cancellation Technique for High Power Supply Rejection," *to appear in J. of Solid State Circuits*, Mar. 2010.

Feed-Forward Noise Cancellation

B. Yang, B. Drost, S. Rao and P. K. Hanumolu, "A high-PSR LDO using a feedforward supply-noise cancellation technique," *2011 IEEE Custom Integrated Circuits Conference (CICC)*, San Jose, CA. 2011, pp. 1-4.
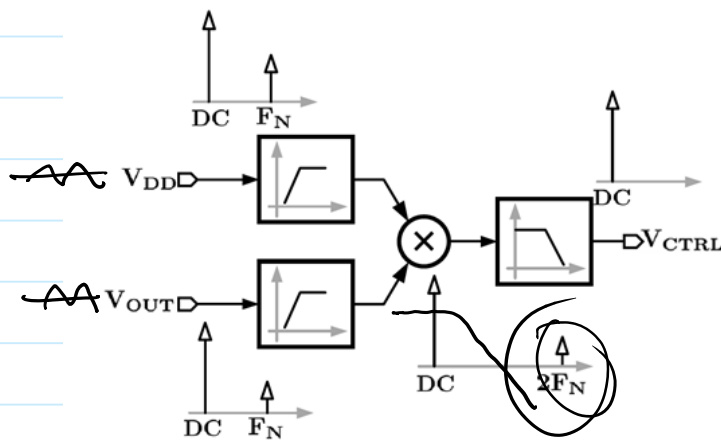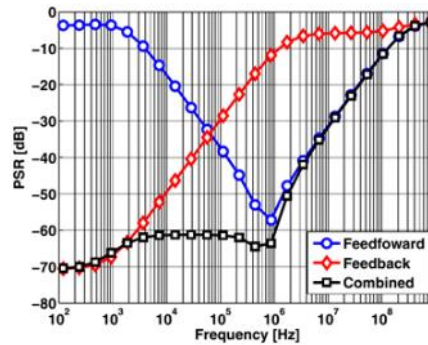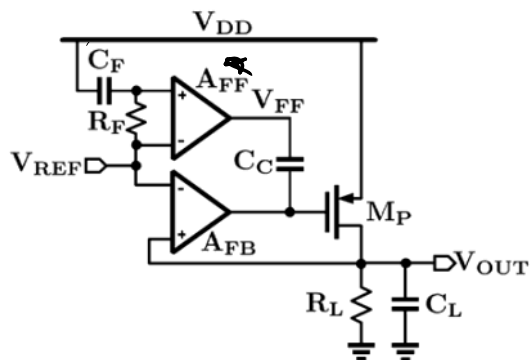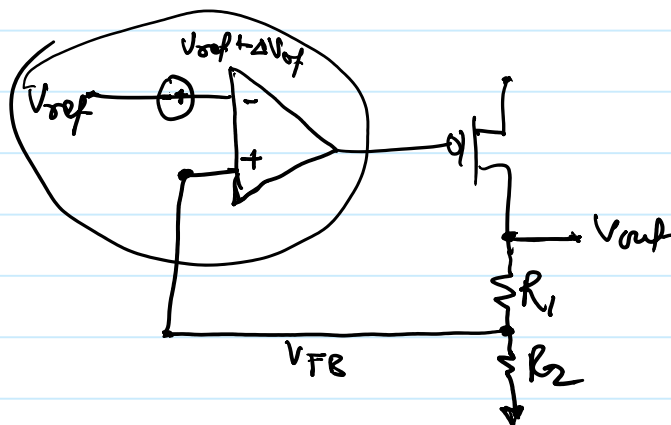
Sources of Error in LDO

1. Vref
2. Loop Gain
3. Offset
4. Mismatch in feedback resistor divider

Offset Cancellation

\# Trimming

\# Chopping

\# Auto-zero

$$V_{out} = \left(1 + \frac{R_1}{R_2}\right) V_{ref}$$