

ABSTRACT

Automatic tuning for linearly tunable filter

(May 2004)

Sung-Ling Huang

Chair of Advisory Committee: Aydin Karsilayan

A new tuning scheme for linearly tunable high-Q filters is proposed. The tuning method is based on using the phase information for both frequency and Q factor tuning. There is no need to find out the relationship between a filter's passband magnitude and Q. A gm-C biquadratic filter is designed to demonstrate the proposed tuning circuitry. The project includes a phase locked loop (PLL) based frequency tuning loop, reference clock generator, and differential difference amplifier (DDA) for dealing with frequency and Q factor tuning loop and linearly tunable second order gm-C bandpass filter. Simulation results for a 10 MHz prototype filter using AMI 0.5 μ m process is presented. The chip testing results show that the automatic frequency tuning error is 2.5% for the 10 MHz case.