**State-variable filter**

Passive sensitivity: Measure of how much a variation in a circuit R or C will change a performance parameter such as the cutoff frequency or the Q of the filter. Considering the resistors and the capacitors to be ideal, but not nominal in value.

Active sensitivity: Measure concerned with the non-ideal, non-infinite, non-frequency-independent gain of the op-amp.

“Jump resonance”: Phenomenon due to the effective non-linearity due to slew rate limiting, manifests itself in terms of instantaneous jumps in output level, and an associated double valued frequency response curve.

State-variable filters are frequently used for modifying frequency response in audio signal processing. At low Q settings they are often used in parametric equalizer circuits, and at high or variable Q settings to create resonant filter modules in analog synthesizers. For manual control of frequency, Rf1 and Rf2 in the section above may be replaced by a dual potentiometer; and for voltage control, the devices U2 and U3 may be replaced by voltage-controlled amplifiers or operational transconductance amplifiers.

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Description générée automatiquement

Une image contenant ligne, Tracé, diagramme

Description générée automatiquement

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Description générée automatiquement

By replacing C1 value by 100µF we obtain this diagram:

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We can conclude that the value of the capacitor used for the band-pass filter affects the resonance of all Bode diagrams.

By adding a resistor to R5 we obtain this schematic:

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And the frequency response result is perfect:

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Description générée automatiquement