

ABSTRAK

IMPLEMENTASI *BAND PASS FILTER (BPF) SALLEN-KEY BUTTERWORTH* UNTUK EKSTRAKSI *DOPPLER TONE 500HZ* PADA PENERIMA *RADIO DIRECTION FINDER*

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Kemajuan ilmu pengetahuan serta teknologi saat ini telah mempengaruhi segala bidang kehidupan manusia, termasuk dalam bidang elektronika. Pada saat ini *Band Pass Filter (BPF)* banyak digunakan pada perangkat elektronik sebagai *filter* atau penyaring frekuensi yang melewatkan sinyal frekuensi dalam rentang frekuensi tertentu yaitu melewatkan sinyal yang berada diantara frekuensi rendah atau *Low Pass Filter (LPF)* hingga frekuensi tinggi atau *High Pass Filter (HPF)*. Pada penelitian ini bertujuan mengetahui hasil perhitungan dari data *Band Pass Filter* Orde 6 pada *cutt-off 500Hz*.

Perancangan rangkaian *Band Pass Filter Sallen-Key Butterworth* orde 6 terdiri dari 2 rangkaian LPF orde 2 yang dirangkai secara seri sehingga diperoleh LPF orde 4, kemudian HPF orde 2 dirangkai secara seri dengan LPF orde 4 sehingga menghasilkan BPF orde 6. Simulasi *Band Pass Filter Sallen-Key* menggunakan *software* PSPICE untuk memperoleh *respon magnitude* yang nantinya dimunculkan dalam bentuk grafik. Sedangkan pengimplementasian aktualnya dilakukan menggunakan komponen elektronika yang sudah dirancang dengan rangkaian BPF orde 6 sehingga diperoleh V_{out} dan dilakukan perhitungan *magnitude response*.

Hasil pengujian rangkaian *Band Pass Filter* menggunakan komponen pasif kapasitor dengan nilai 10nF, kemudian komponen pasif resistor dengan nilai 22k Ω , 47 Ω , 45k Ω , dan 470 Ω serta menggunakan komponen aktif IC Op-Amp LM741. Hasil perhitungan *Band Pass Filter* memperoleh nilai A_v sebesar 0,4 dan dB sebesar -7,96 sesuai dengan frekuensi *cut-off 500Hz*. Alat ini di implementasikan menjadi salah satu bagian komponen pada penerima *Radio Direction Finder*.

Kata Kunci: *Sallen-Key, Butterworth, Frekuensi, Band Pass Filter*

ABSTRACT

IMPLEMENTATION OF BAND PASS FILTER (BPF) SALLEN-KEY BUTTERWORTH FOR 500HZ DOPPLER TONE EXTRACTION ON RADIO DIRECTION FINDER RECEIVER

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The current advances in science and technology have affected all spheres of human life, including in the field of electronics. At this time the Band Pass Filter (BPF) is widely used in electronic devices as a filter or frequency filter that passes a frequency signal in a certain frequency range, namely passing a signal that is between a low frequency or Low Pass Filter (LPF) to a high frequency or High Pass Filter (HPF). This study aims to find out the calculation results from the 6th Order Band Pass Filter data at the 500Hz cut-off.

The design of the 6th order Sallen-Key Butterworth Band Pass Filter series consists of 2 series of 2nd order LPFs assembled in series so that 4th order LPFs are obtained, then 2nd order HPFs are assembled in series with 4th order LPFs so as to produce 6th order BPF. The Sallen-Key Band Pass Filter Simulation uses PSPICE software to obtain a magnitude response which will later appear in the form of a graph. Meanwhile, the actual implementation is carried out using electronic components that have been designed with a 6th order BPF circuit so that V_{out} is obtained and a magnitude response calculation is carried out.

The test results of the Band Pass Filter circuit use capacitor passive components with a value of 10nF, then resistor passive components with values of 22k Ω , 47 Ω , 45k Ω , and 470 Ω and use the active components of op-amp IC LM741. The calculation results of the Band Pass Filter obtained an A_v value of 0.4 and dB of -7.96 according to the 500Hz cut-off frequency. This tool is implemented as one of the component parts of the Radio Direction Finder receiver.

Keywords: Sallen-Key, Butterworth, Frequency, Band Pass Filter