Comparison and Analysis:

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| --- | --- | --- | --- |
| Pre-emphasis | Spice | Experimental | %error |
| fc1 | 495.43 | 436 | 11.996 |
| f0 | 1000 | 940 | 6.000 |
| fc2 | 2014.8 | 1980 | 1.727 |
| Gain at fc1 | 25.334 | 24.6089 | 2.862 |
| Gain at f0 | 28.334 | 27.514 | 2.894 |
| Gain at fc2 | 25.334 | 24.609 | 2.862 |
| Gain at 500Hz | 25.429 | 25.8 | 1.459 |
| Gain at 2000Hz | 25.407 | 24.609 | 3.141 |

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| --- | --- | --- | --- |
| De-emphasis | Spice | Experimental | %error |
| fc1 | 130.25 | 113.25 | 13.052 |
| f0 | 1000 | 910 | 9.000 |
| fc2 | 7674.3 | 6600 | 13.999 |
| Gain at fc1 | -3 | -2.87 | 4.333 |
| Gain at f0 | -31.091 | -31.28 | 0.608 |
| Gain at fc2 | -3 | -3.005 | 0.167 |
| Gain at 500Hz | -24.493 | -28.13 | 14.849 |
| Gain at 2000Hz | -24.494 | -21.91 | 10.550 |

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| --- | --- | --- | --- |
| Overall | Spice | Experimental | %error |
| Gain at 100Hz | 0.2378 | -0.574 | 341.38 |
| Gain at 200Hz | 2.687 | 0.1062 | 96.05 |
| Gain at 500Hz | 0.935 | -2.137 | 328.56 |
| Gain at 1000Hz | -2.76 | -1.98 | 28.26 |
| Gain at 2000Hz | 0.914 | 2.48 | 171.33 |
| Gain at 5000Hz | 2.59 | 4.434 | 71.20 |
| Gain at 10000Hz | -0.15 | -0.825 | 450.00 |

Totally, when comparing the values of spice and experimental at cut-off frequency and gain for the individual emphasis filters, we have the low %error. The %error of combination filter is not normal because the value of comparison is very small, but we can see that value of spice and experimental are very close. Therefore, the filter which we design is qualified.