ELECENG 3EJ4 Lab 5

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Special note: I am currently not in Canada, and I purchased all device my own. Some parameters may be different from that in Campus Store.

**Q1:**

1. Calculate transfer function

When s = 0 at low frequency

-3dB frequency:

1. The simulated and measured plot is below:

图表

描述已自动生成图表

描述已自动生成

They both have approximate gain of 1.5 V/V at low frequency. In simulation, the -3dB frequency is about 1578Hz, it is very close to the calculated value. That in measurement is about 1122Hz. Although this is smaller than calculated value, since there is uncertainty in measurement and device, we still accept the result as expected.

**Q2:**

V1 is between R1 & R2

Since R = R1 = R1 = R3 = R4,

When s = 0 at low frequency, the gain is

In simulation, the gain at 1Hz is 6.02dB or 2V/V. In measurement, the gain at 1Hz is 6.05dB or 2V/V. They are very close to the calculated value, so they agree to each other.

**Q3:**

Pole frequency:

Pole factor:

The calculate cut off frequency:

Solve to get

In simulated fc is about 411Hz, and in measurement fc is about 447Hz. All values are close and agree to each other.

Since there is no zeros pole in the numerator, the max gain is at frequency fmax = 0Hz, and the value is 2V/V which is the low frequency gain. All low frequency value in calculation, measurement, and simulation are close and agree to each other.

**Q4:**

V1 is point between R1 and C2

Since V- = V+ = 0V

Since R1 = R2 = R, C1 = C1 = C

In simulation, the centre frequency gain is -6.02dB. In measurement, the centre frequency gain is -6.15dB. All values are close, so they are agreeing to each other.

**Q5:**

Centre Frequency:

In simulation the gain is at max at 663.41Hz, so this agrees to the calculated result. in measurement is 549Hz. Although it smaller than calculated result, since there is uncertainty, we see they agree to each other.

Pole Frequency:

In simulation the pole frequency is 272.67Hz and 1604.06Hz, so this agrees to the calculated result. in measurement is 194.98Hz and 1122Hz. Although it smaller than calculated result, since there is uncertainty, we see they agree to each other.