LC Filter Design Using Equal Value R Gyrator

The folllowing Equations calculate the C values for a defined R, Q, and FO. This to be used for the form of gyrator that uses equal value R's and a single opamp/follower.

Where...
FO = resonate frequency in Hertz
R = value of the two resistors in Ohms
Q = FO/Bandwidth

$FO := 270$
$Q := 1$
$R := 1000$

CS is the C value for the LC filter

$$CS := \frac{1}{(4 \cdot \pi) \cdot R \cdot Q \cdot FO} \qquad CS = 2.947 \times 10^{-7} \qquad \text{or } 0.294 \text{ mfd}$$

CI is the C value for the Gyrator that simulates the L in the LC filter

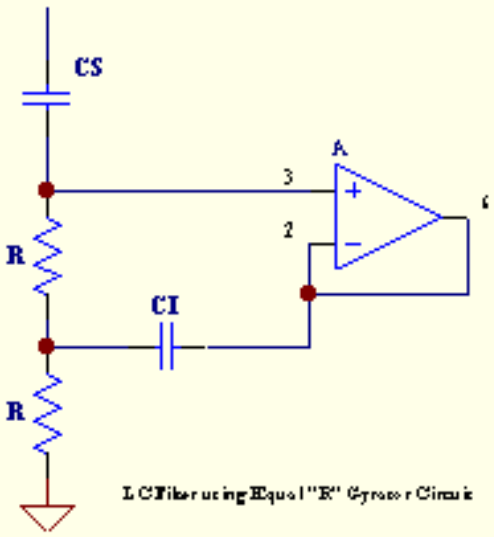
$$CI := \frac{Q}{\pi \cdot R \cdot FO} \qquad CI = 1.179 \times 10^{-6} \qquad \text{or } 1.179 \text{ mfd}$$

So to build a LC filter with Q = 1, center freq = 270 Hz, and using 1k resistors, use a 0.294 mfd in series with the gryator which uses a 1.179 mfd cap.

To prove the above...

$$FO := \frac{1}{(2 \cdot \pi) \cdot R \cdot \sqrt{CS \cdot CI}}$$

$FO = 270$


CS
A
3
2
R
CI
R