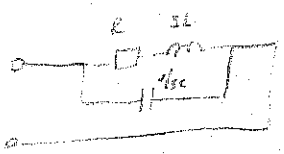

$$\frac{(R+sL)\,\frac{1}{sC}}{R+sL+\frac{1}{sC}} = \frac{R+sL}{1+sRC+s^2LC} = \frac{R+jwL}{1+jwRC-w^2LC} = \frac{(R+jwL)(1-w^2LC-jwRC)}{(1-w^2LC)^2+(wRC)^2} \quad \text{A}$$

$$= \frac{R-w^2LCR \cancel{+} jwR^2C+jwL-jw^3L^2C+w^2RLC}{A}$$

$$= \frac{R-w^2LCR+w^2RLC}{A} + j\underbrace{\frac{(wL-wR^2C-w^3L^2C)}{A}}_{B}$$

eil beim Resonanzfall fließt in der Schaltung max. Strom.

$f=f_0 \Rightarrow B=0 \Rightarrow$

$$wL-wR^2C-w^3L^2C=0$$

$$w\underbrace{(L-R^2C-w^2L^2C)}_{=0}=0 \qquad (w=0)$$

$$L-R^2C-w^2L^2C=0$$

$$w^2L^2C = L-R^2C$$

$$w^2 = \frac{L-R^2C}{L^2C}$$

$$(2\pi f_0)^2 = \frac{1}{LC}-\left(\frac{R}{L}\right)^2$$

$$f_0 = \frac{1}{2\pi}\sqrt{\frac{1}{LC}-\left(\frac{R}{L}\right)^2}$$