For the circuit shown above, note there are only two poles, why? Calculate those two poles. (We are looking for a somewhat more insightful explanation than “because the denominator of the transfer function is of the second order.”)

Then, how many poles are there if there happens to be a resistance, \( R_{GD} \) in series with \( C_{GD} \)? Explain and calculate all the poles.
For the circuit shown above,

a) Compute the impedance looking into the source terminal as a function of frequency. (Ignore Cgd for simplicity and do not include CL).

b) If 1/gm < Rs, the output impedance of the source follower (the circuit shown above) shows inductive behavior. Why? If we use an equivalent three components circuit below to represent the output impedance of the source follower, find the expressions for all three elements.