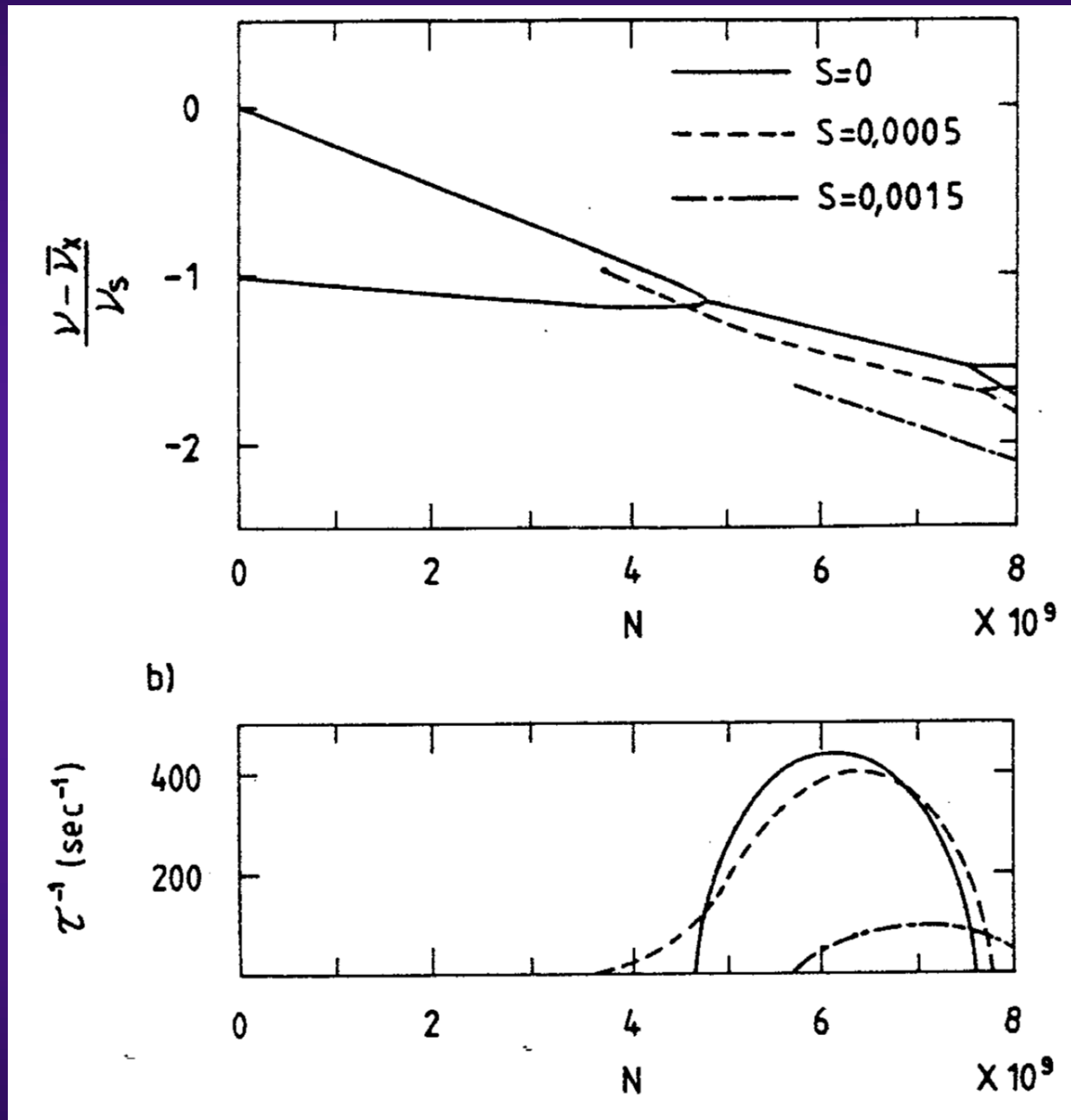


UPDATE ON LANDAU DAMPING FOR LHC TMCI WITHOUT ADT (with two-mode model)

E. Métral

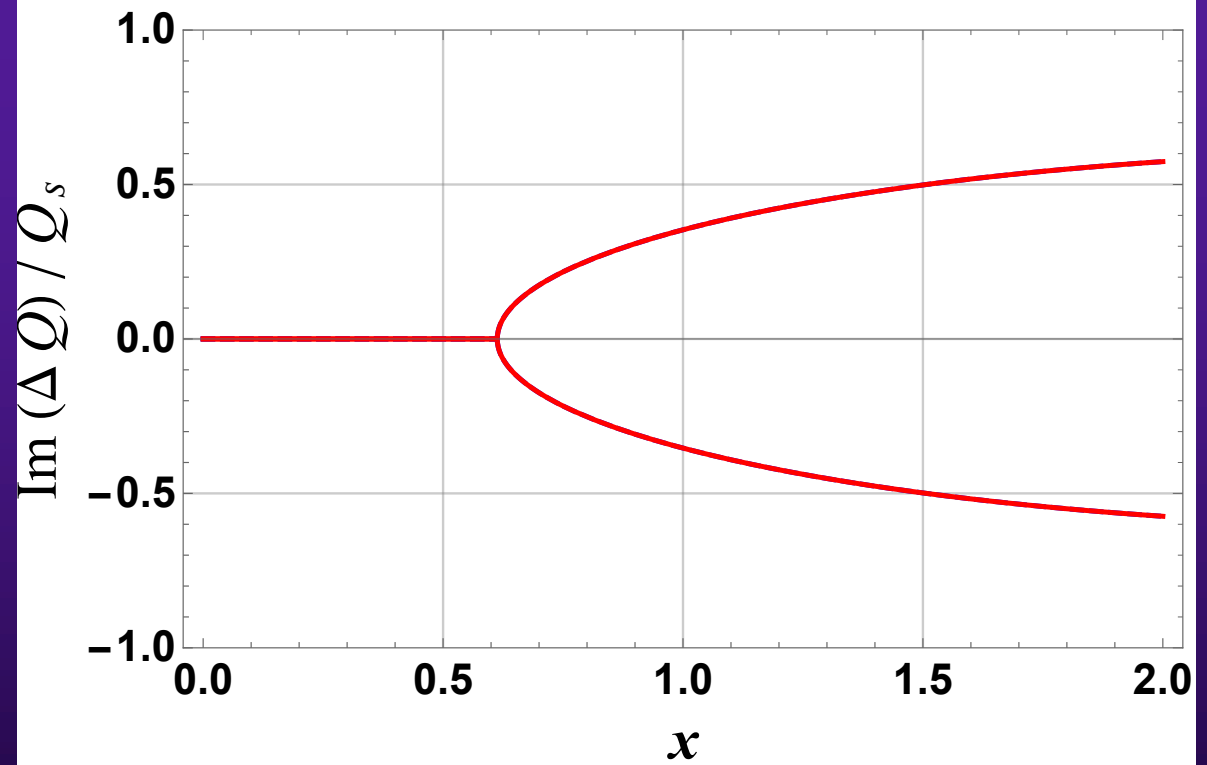
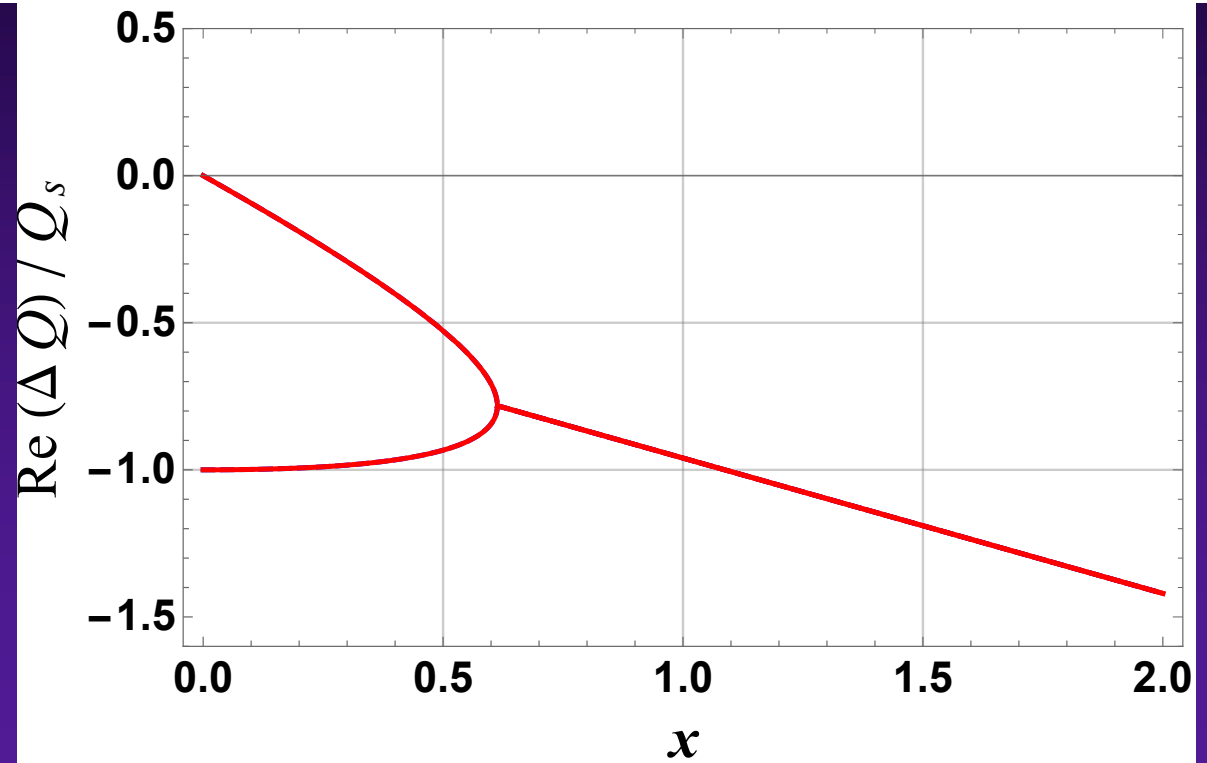
- ◆ See **1st part** on https://indico.cern.ch/event/712792/contributions/2928184/attachments/1617334/2575962/LandauDampingForTMCI_EM_19-03-18.pdf (with a numerical issue still to be solved...)
- ◆ **Reminder** on **Y.H.Chin's** **result** (<https://cds.cern.ch/record/160217/files/198507010.pdf>)
- ◆ **Numerical issue studied** => Updated results presented today
- ◆ **Conclusion and next step**

Reminder on Y.H.Chin's result

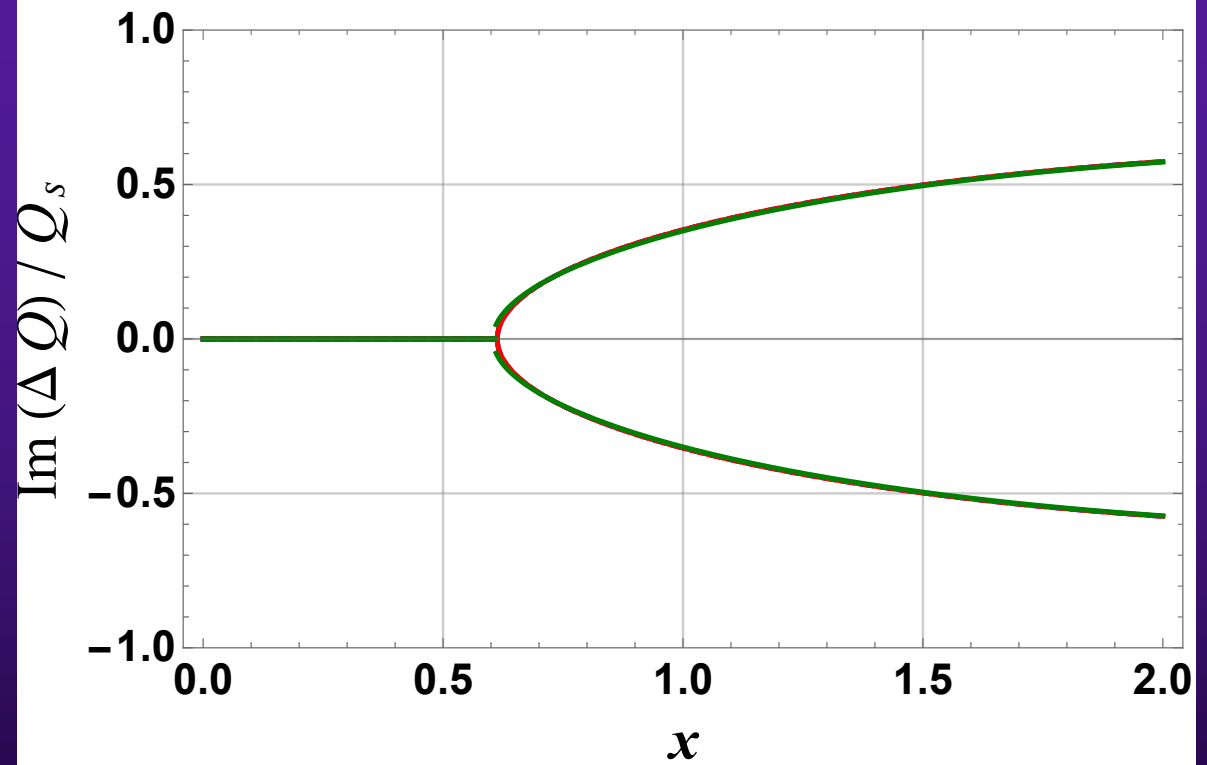
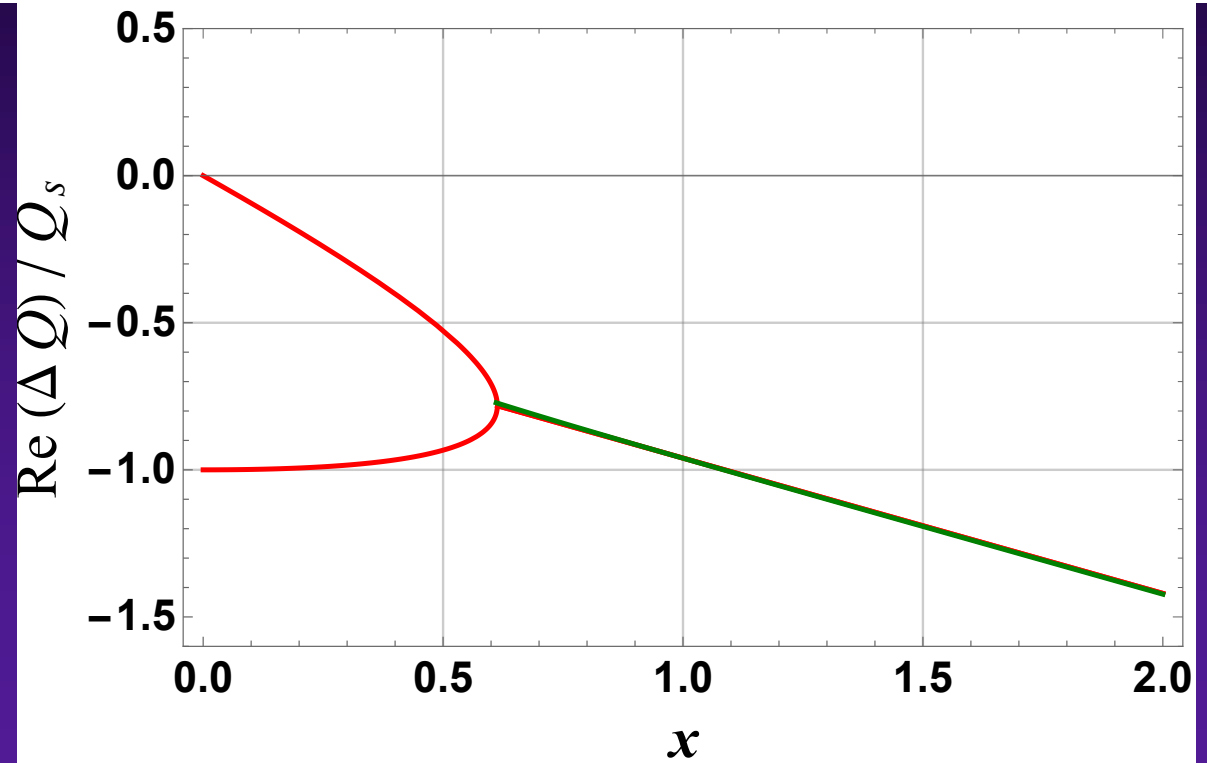


UPDATED RESULTS

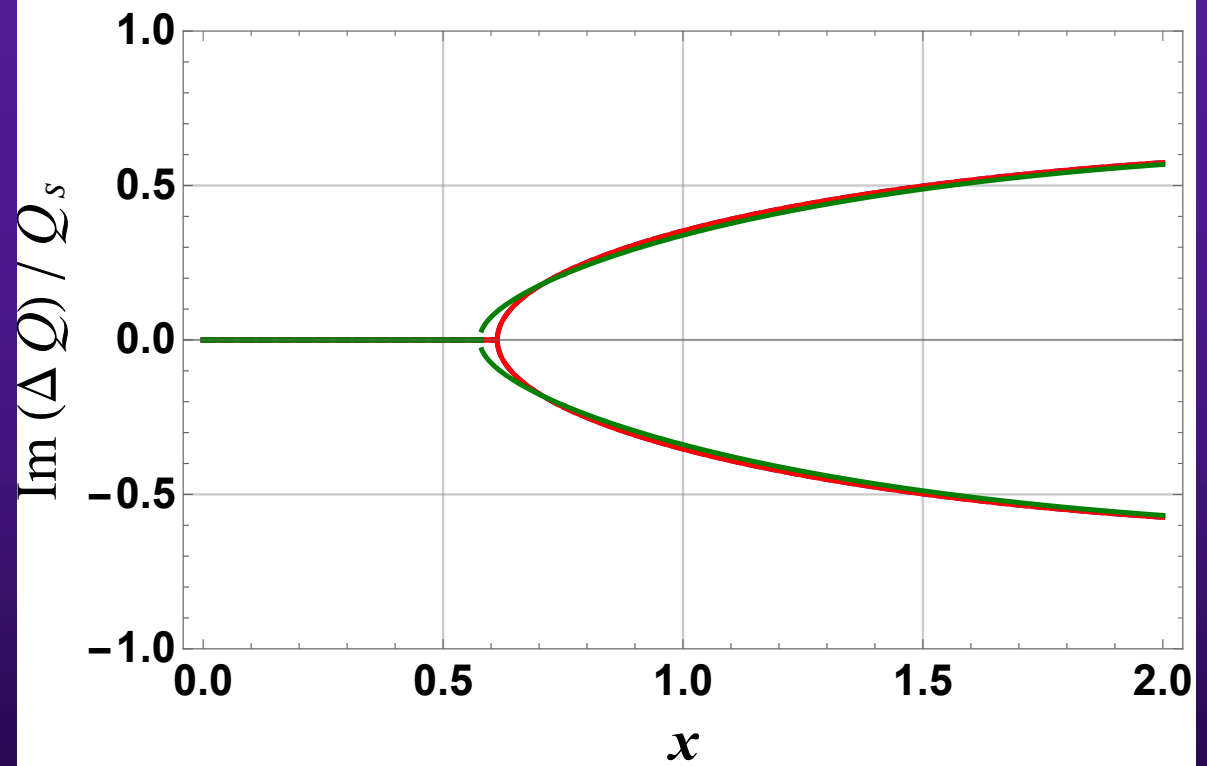
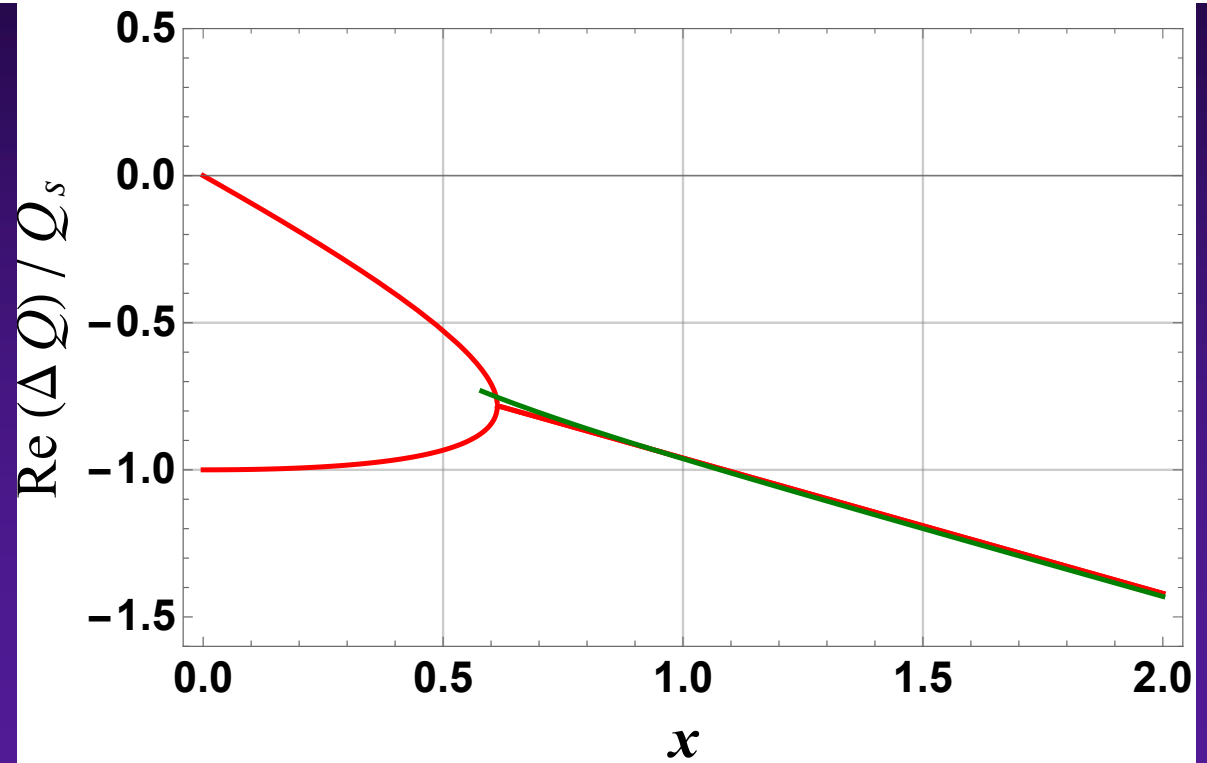
◆ $\Delta q = 0$



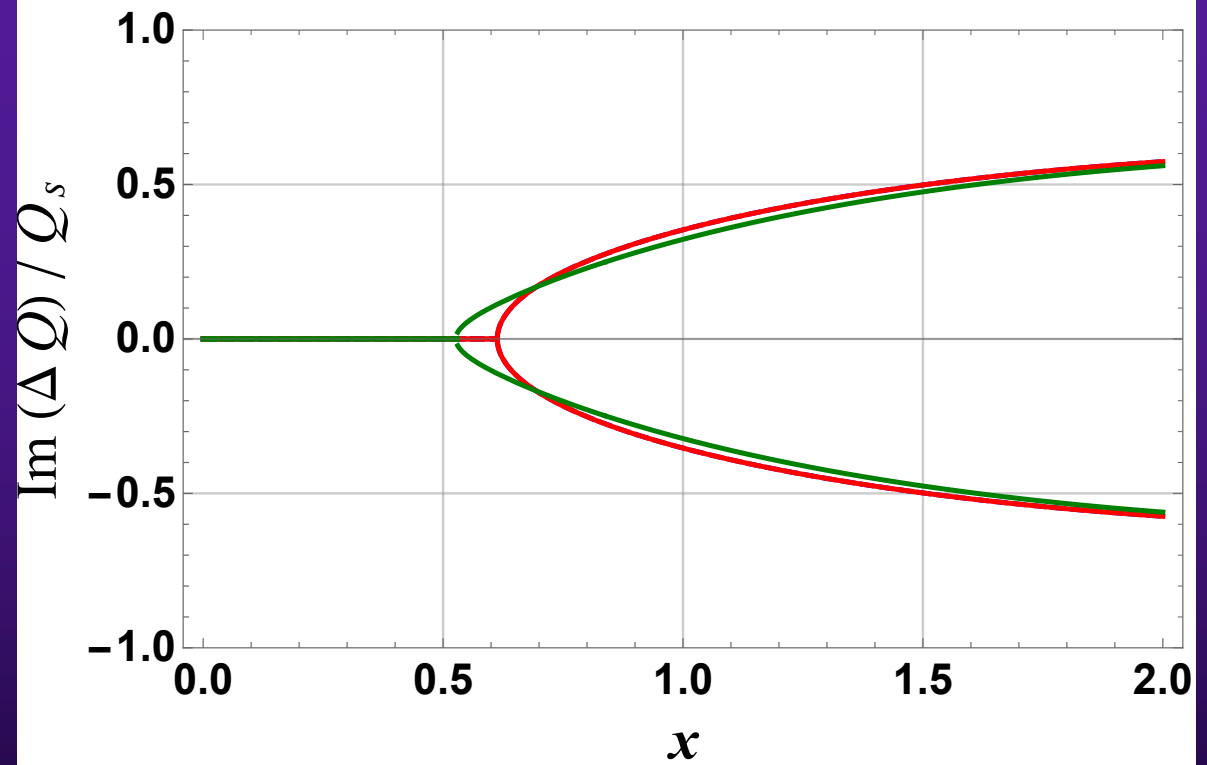
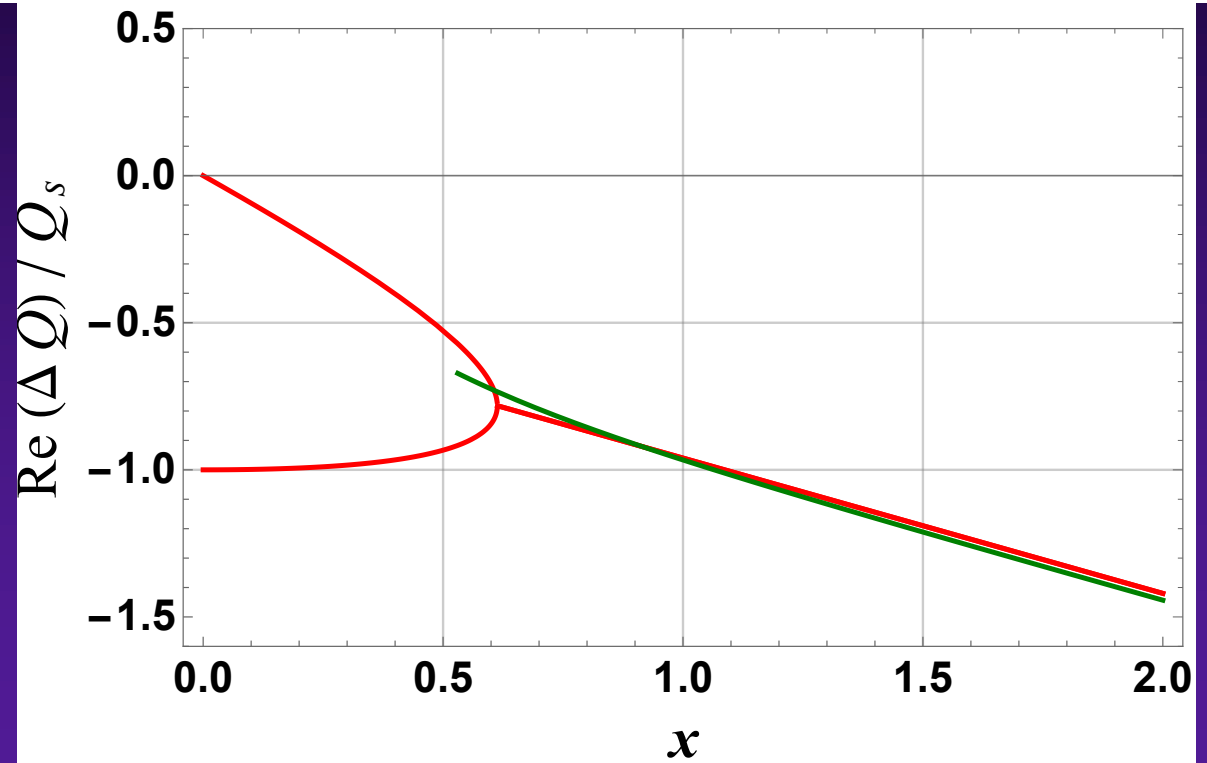
◆ $\Delta q = 0.1$
(update)



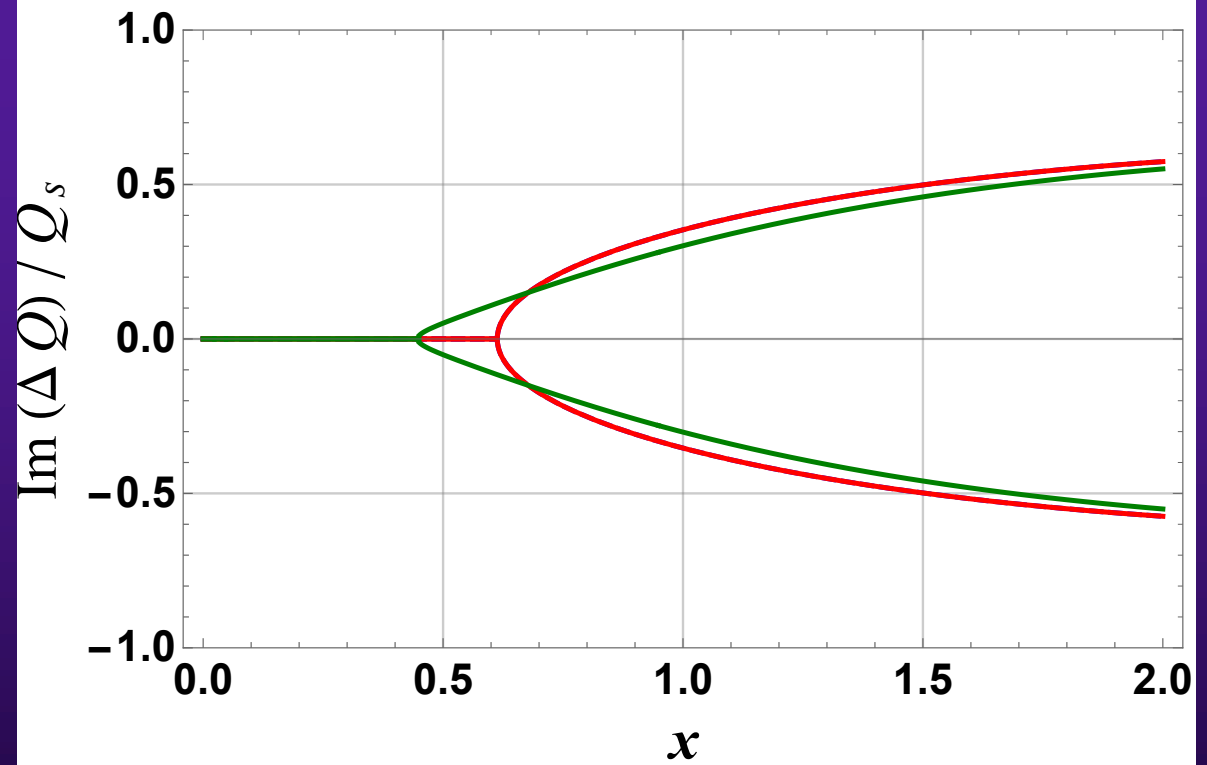
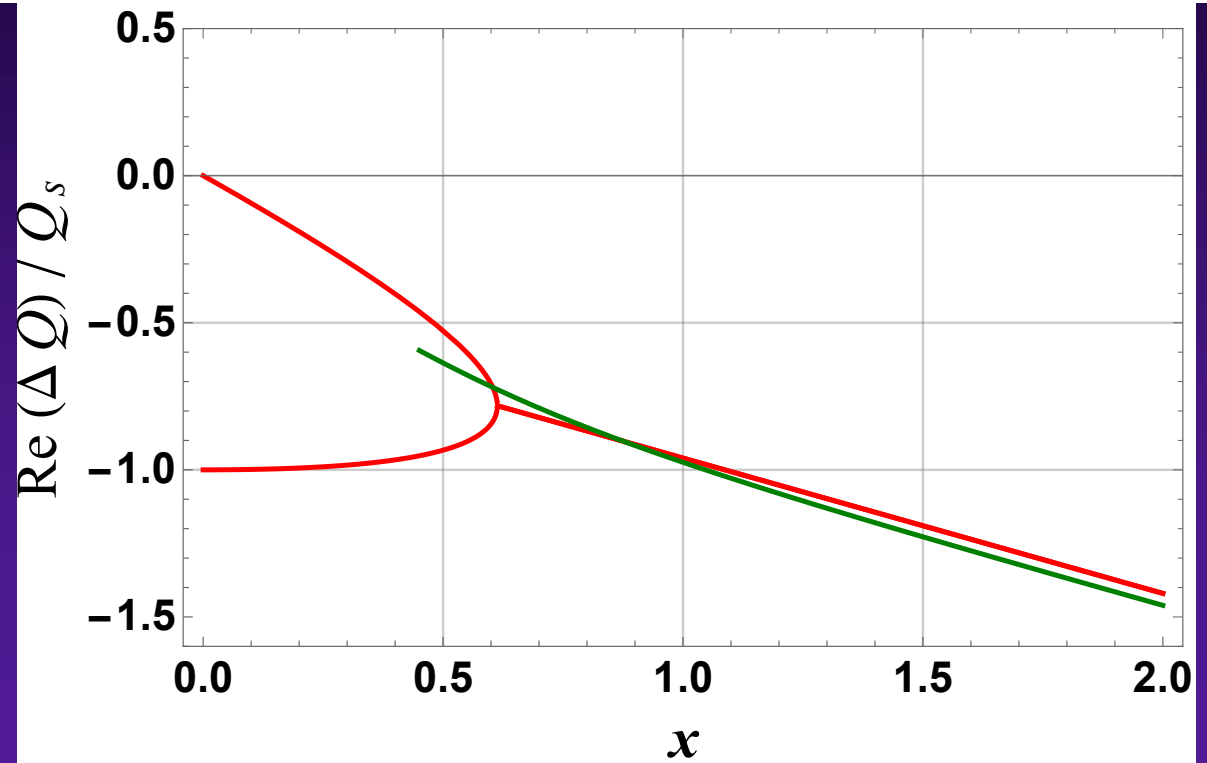
◆ $\Delta q = 0.2$
(update)



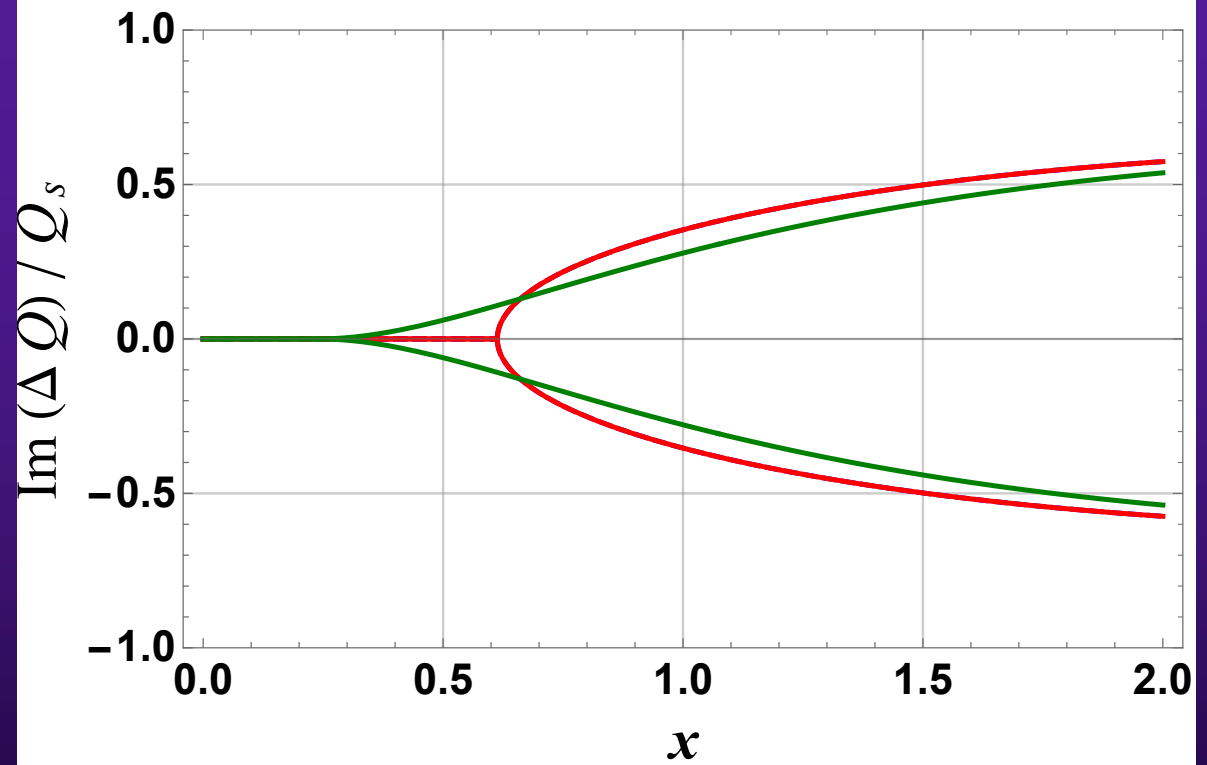
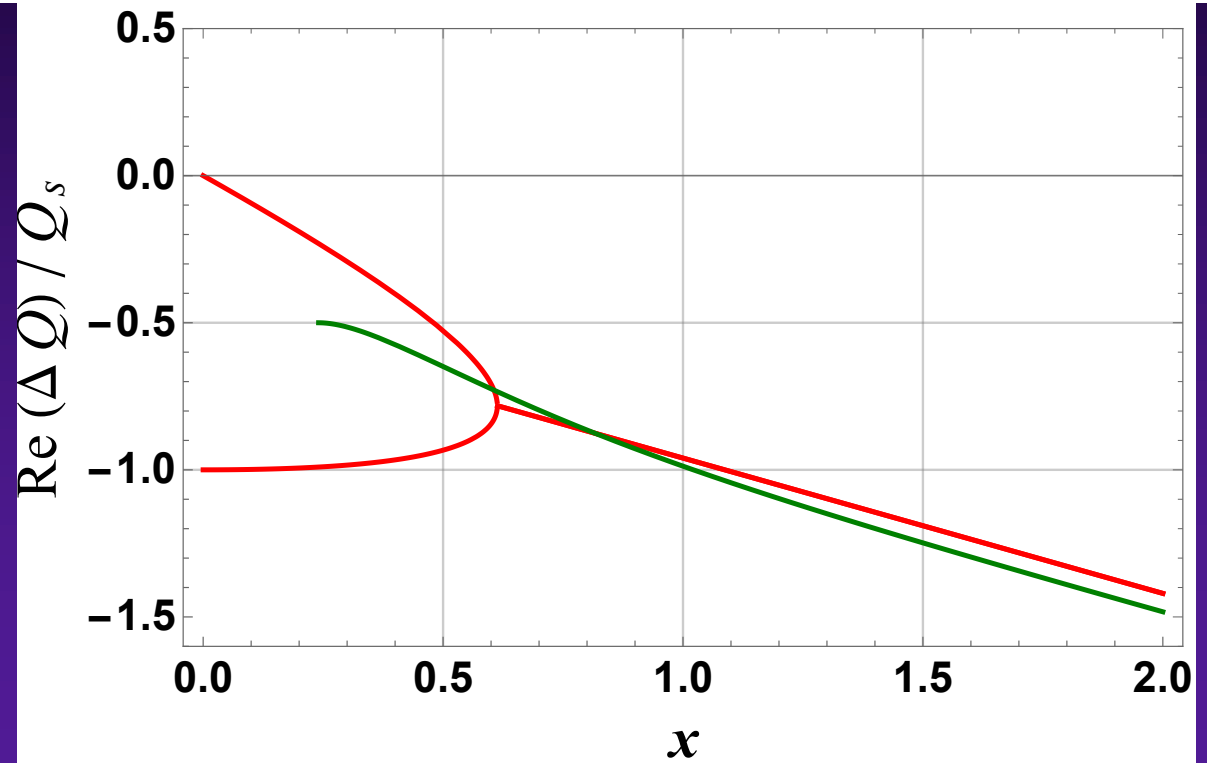
◆ $\Delta q = 0.3$
(update)



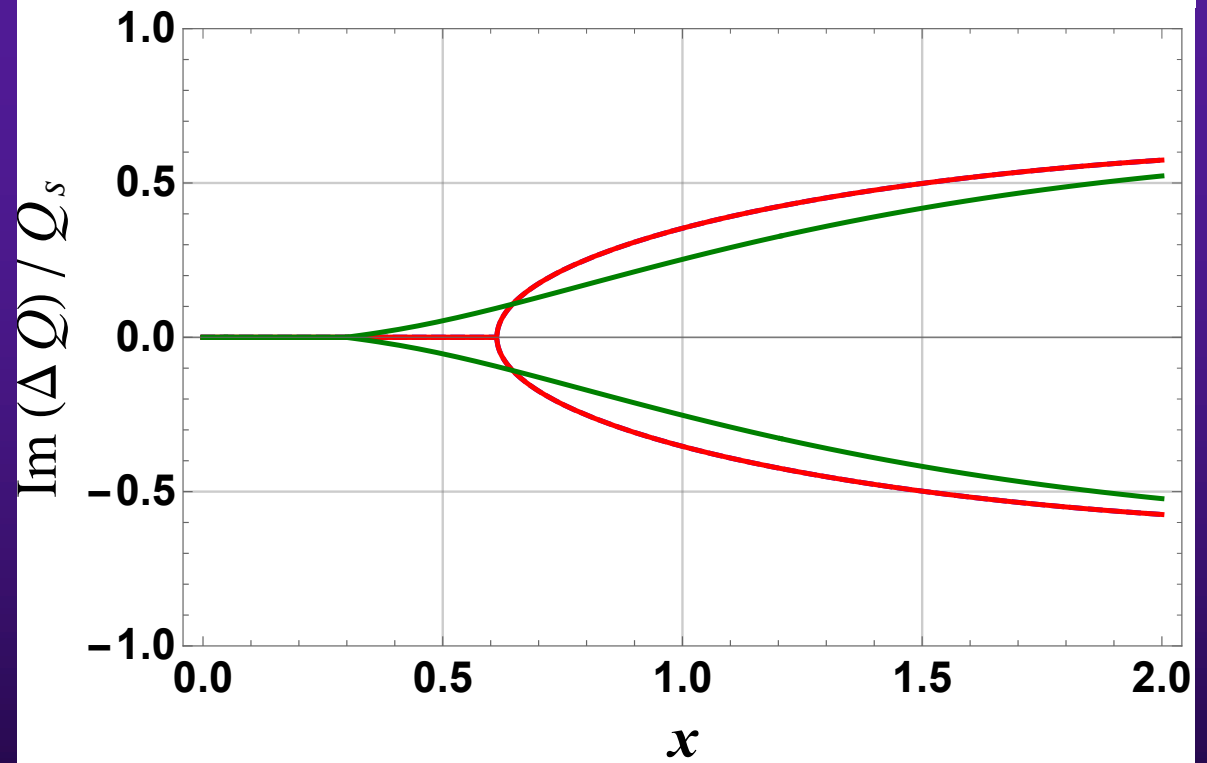
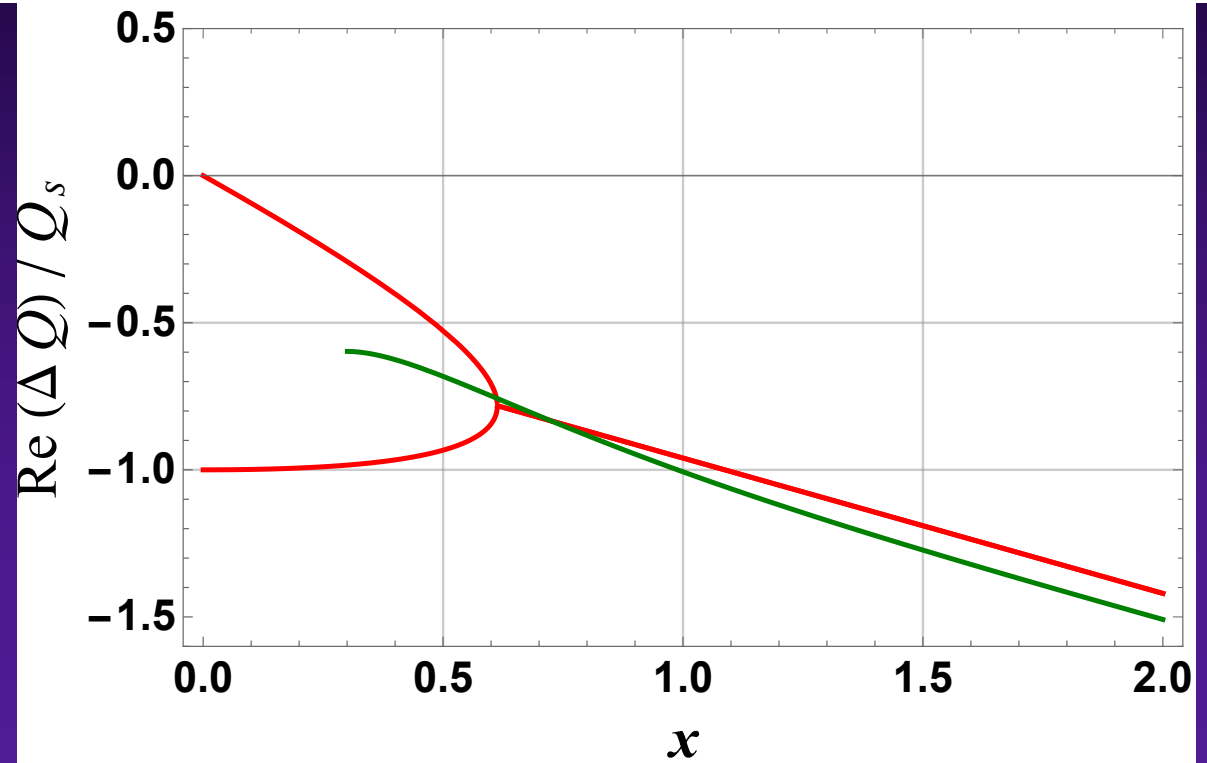
◆ $\Delta q = 0.4$
(update)



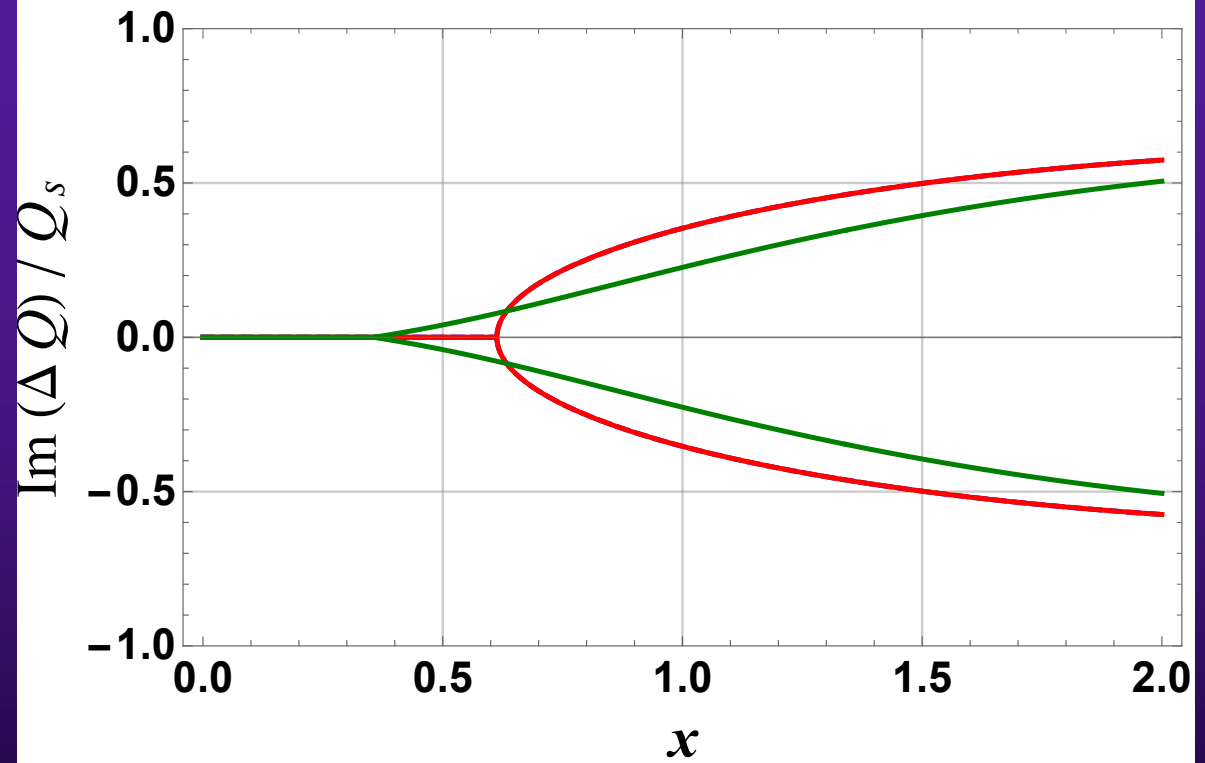
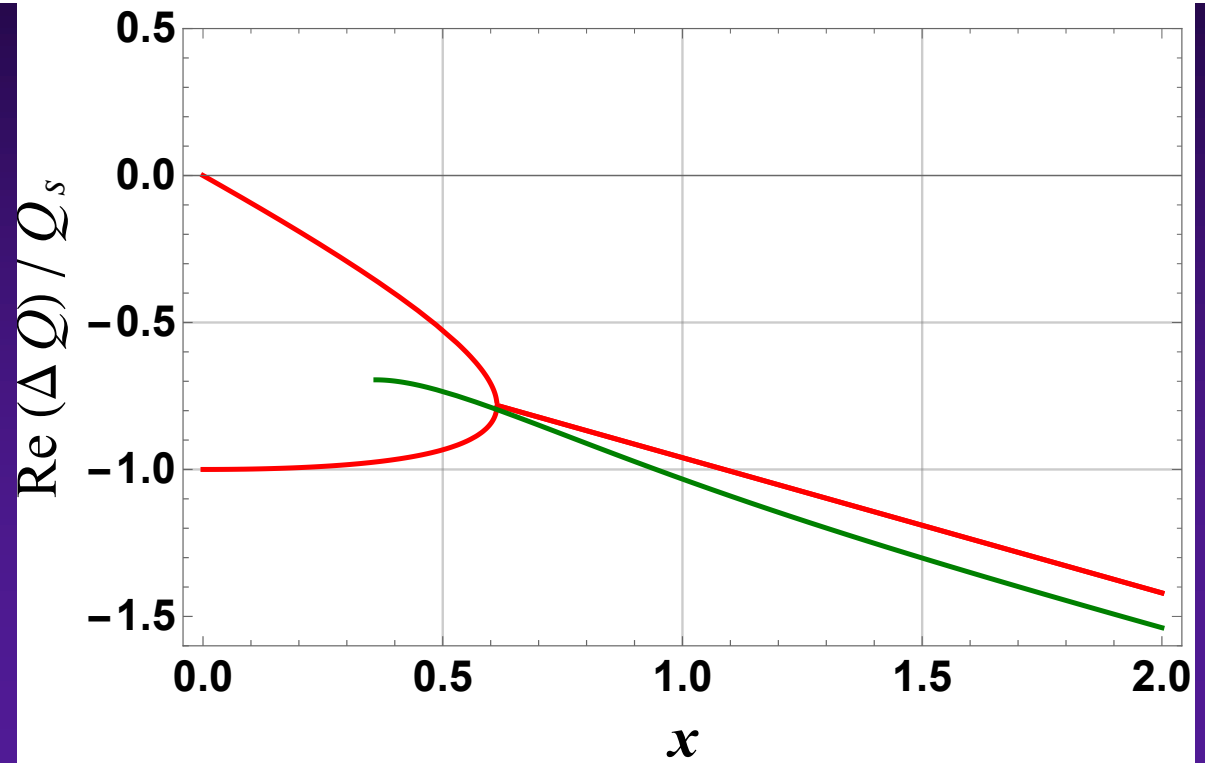
◆ $\Delta q = 0.5$
(update)



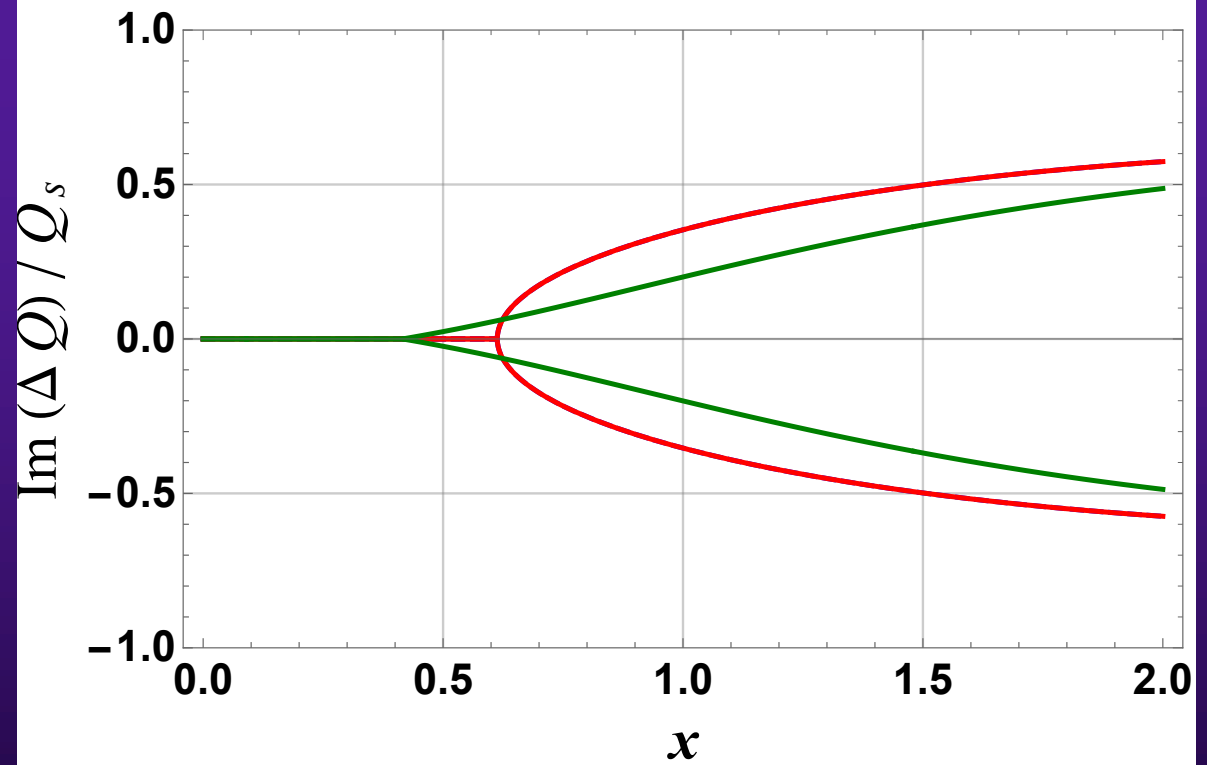
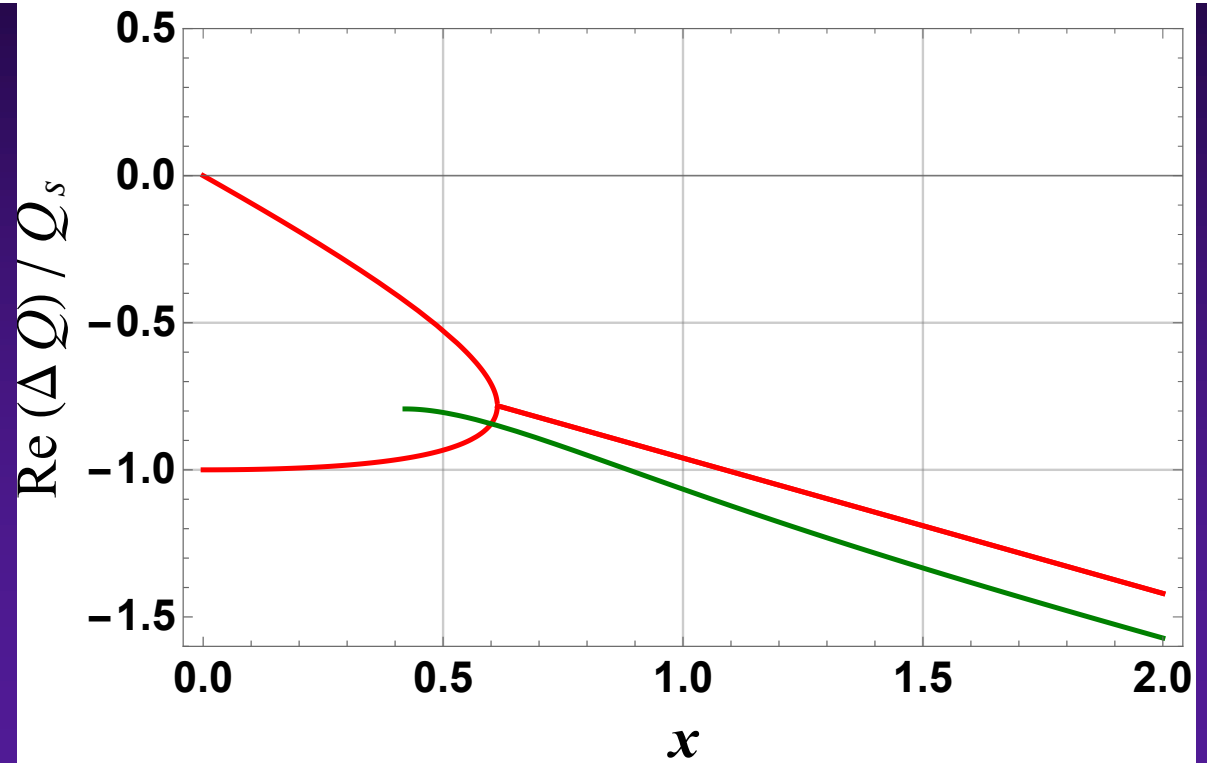
◆ $\Delta q = 0.6$
(update)



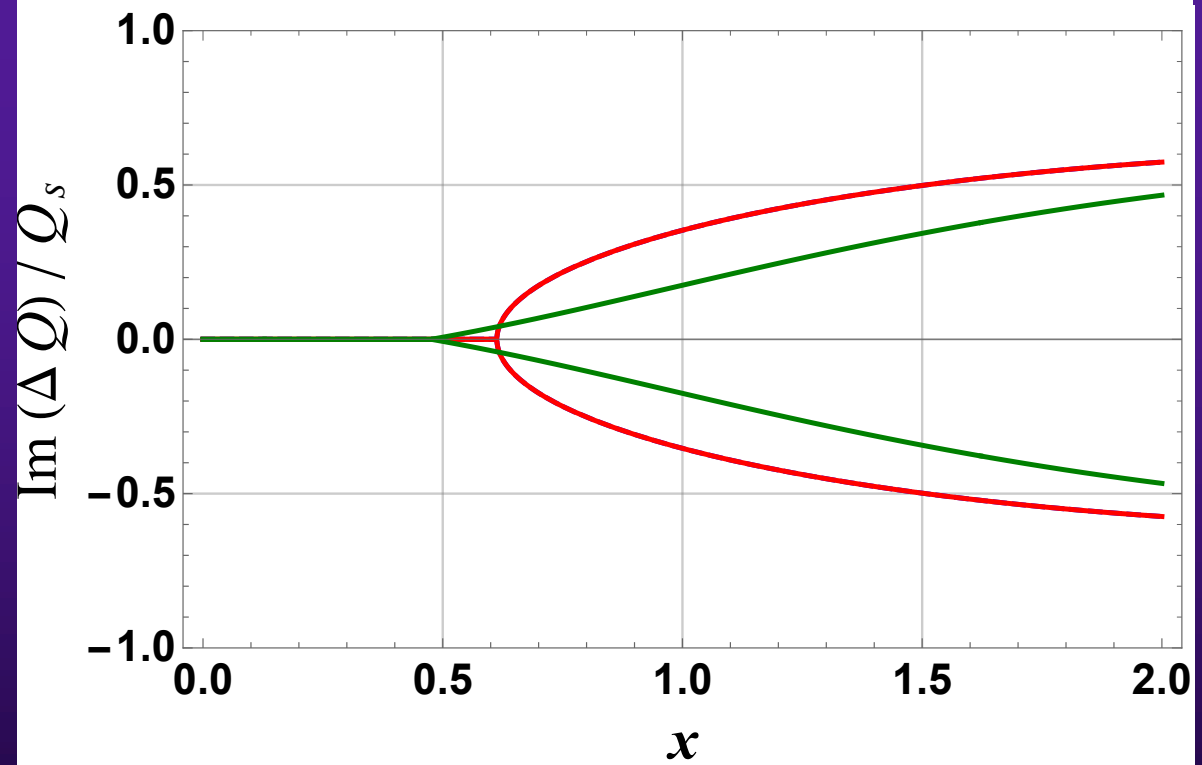
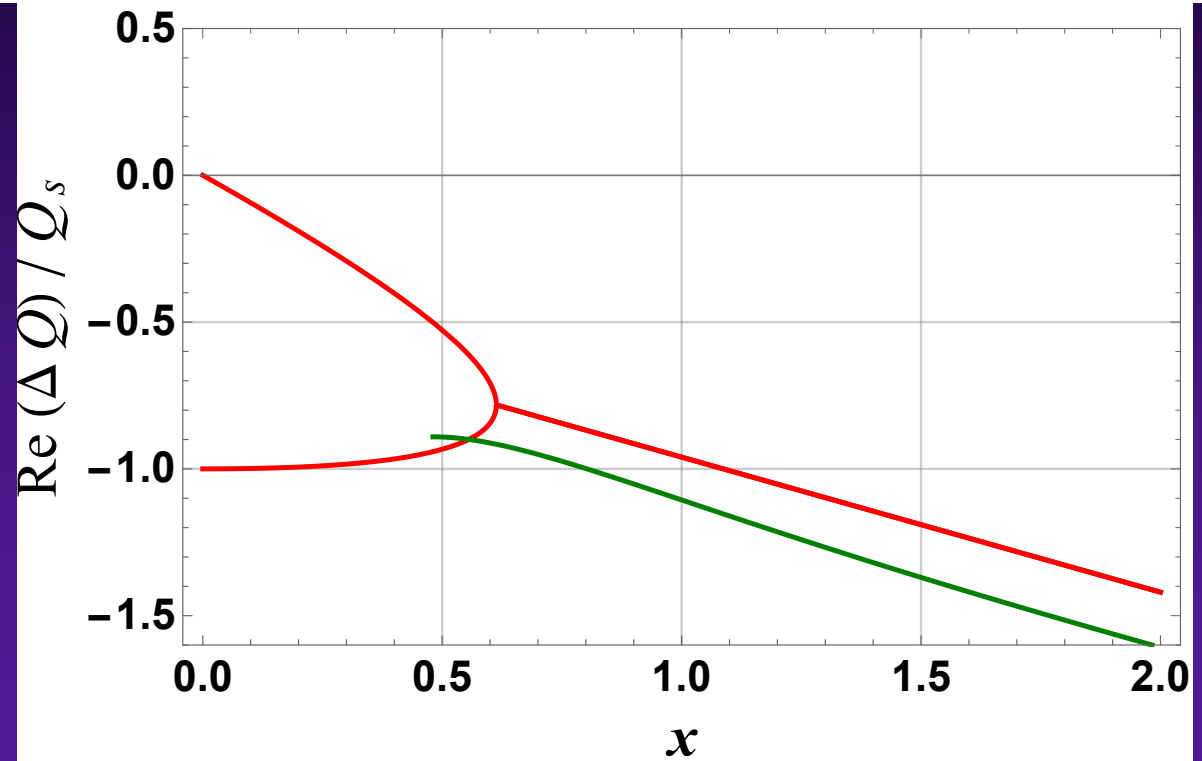
◆ $\Delta q = 0.7$
(update)



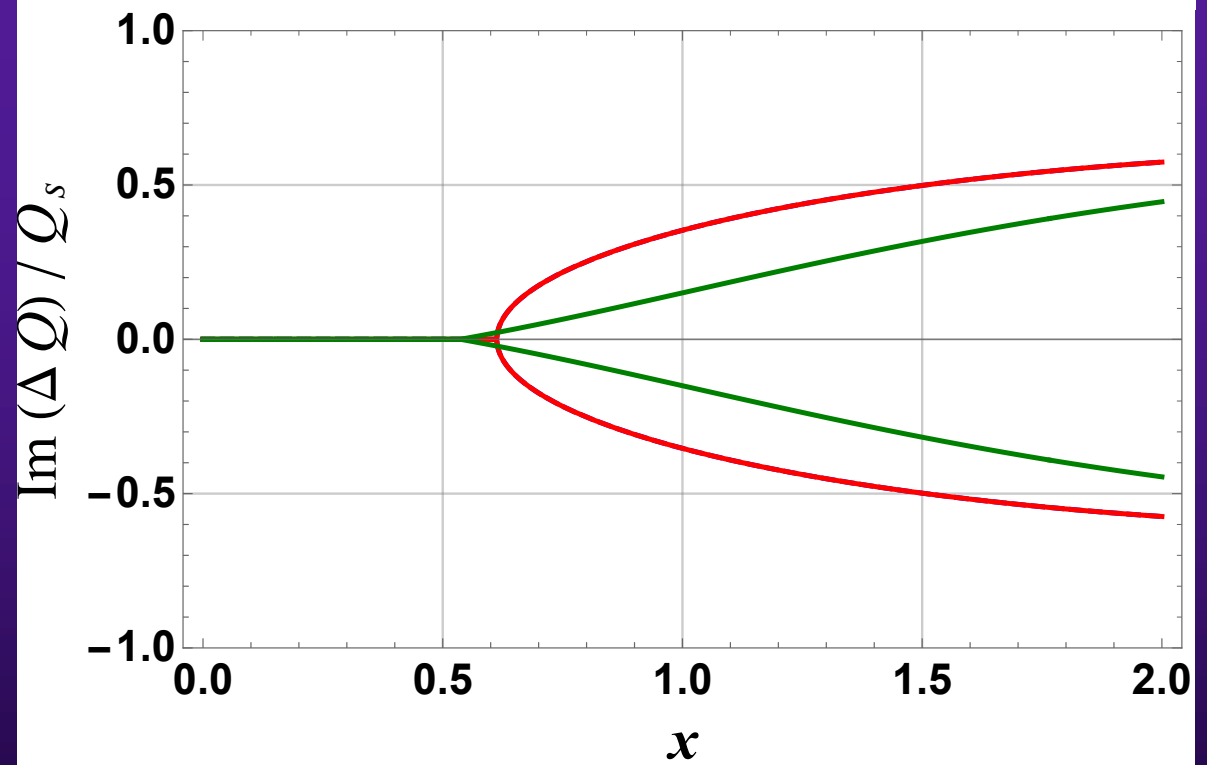
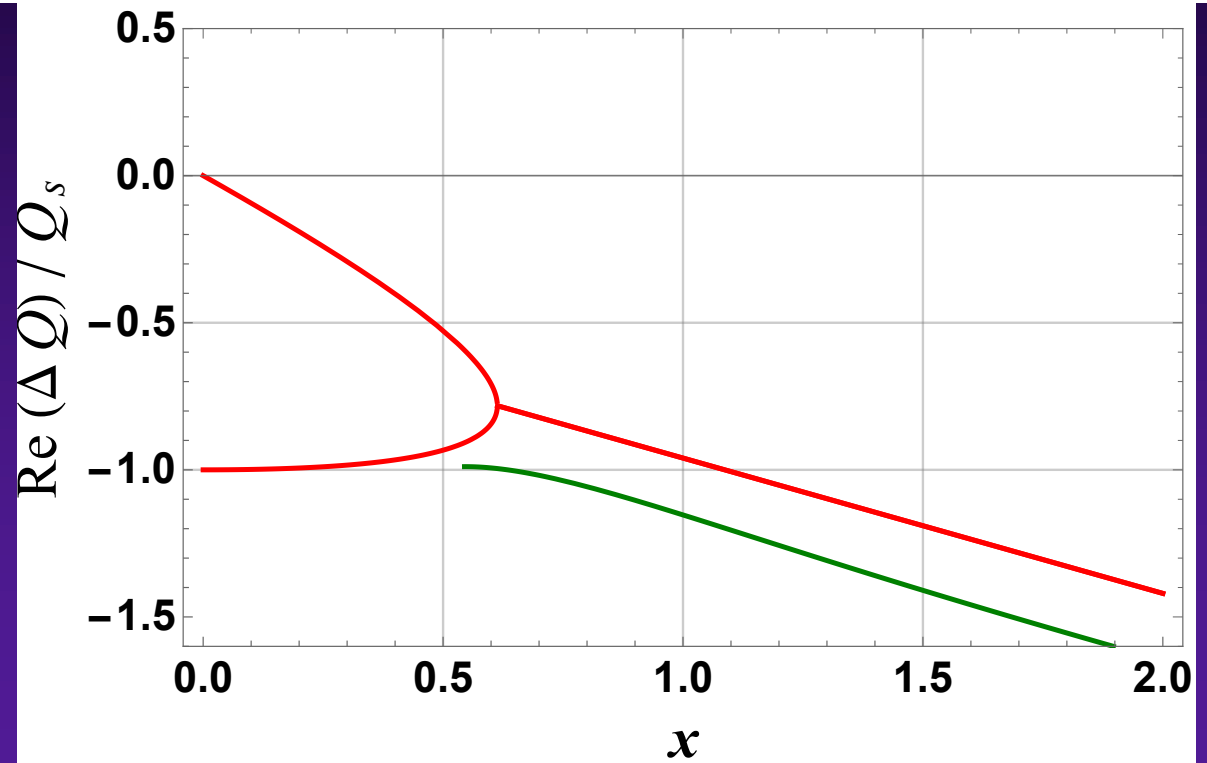
◆ $\Delta q = 0.8$
(update)



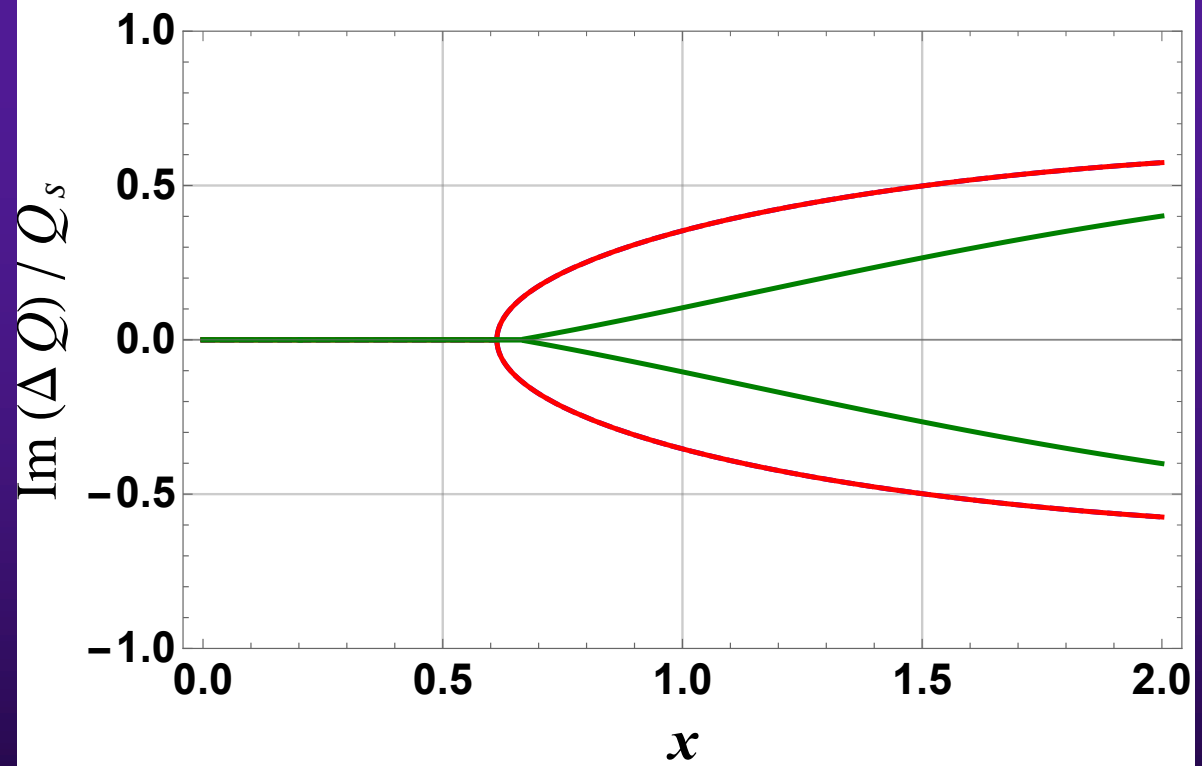
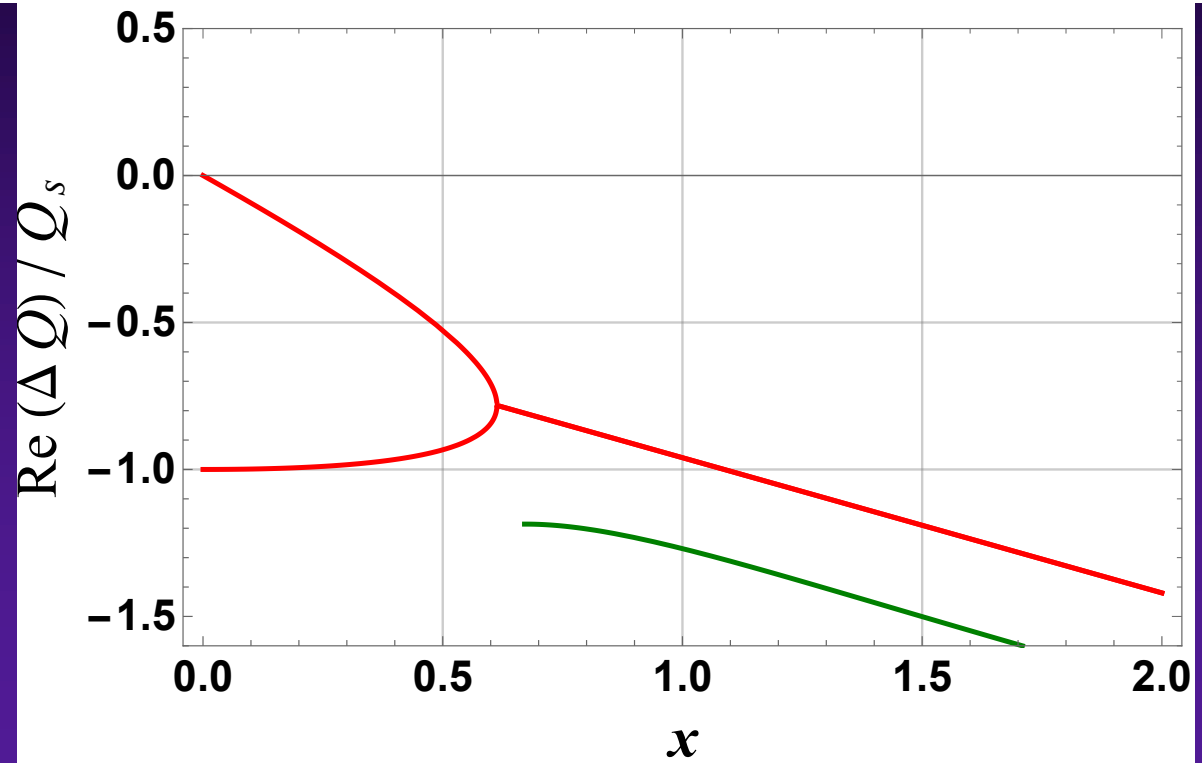
◆ $\Delta q = 0.9$
(update)



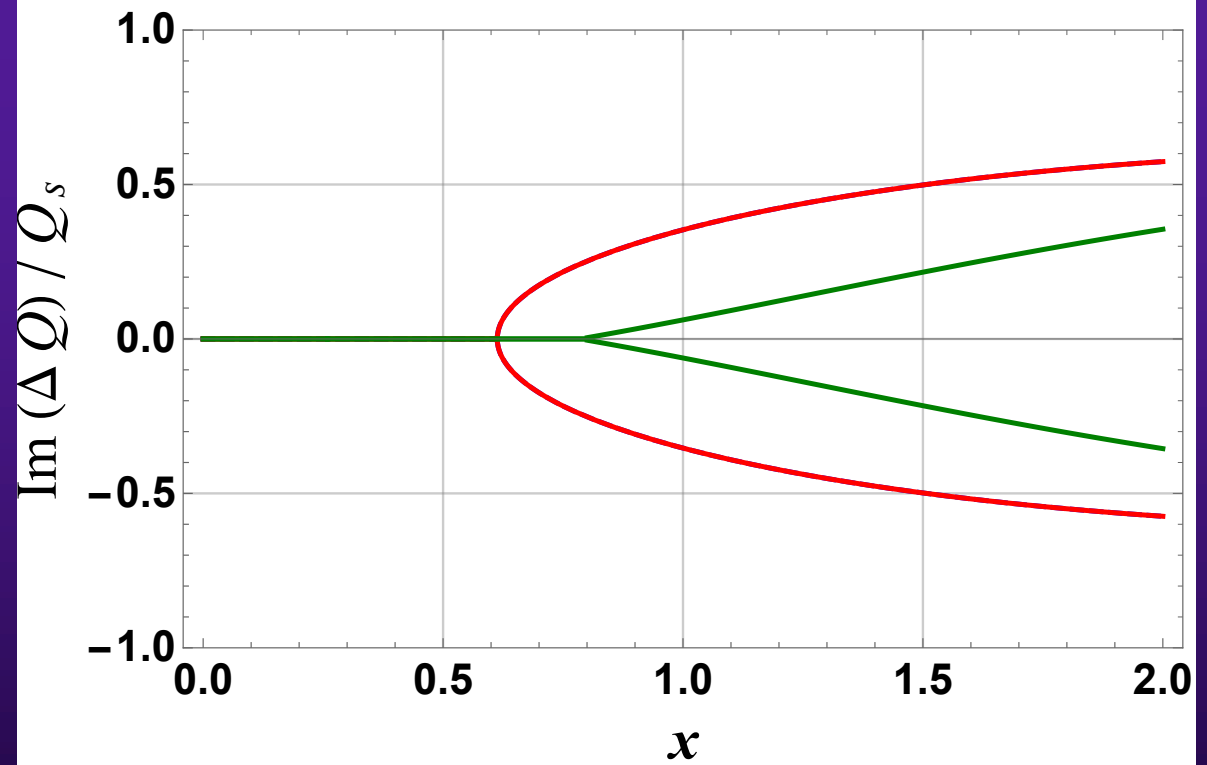
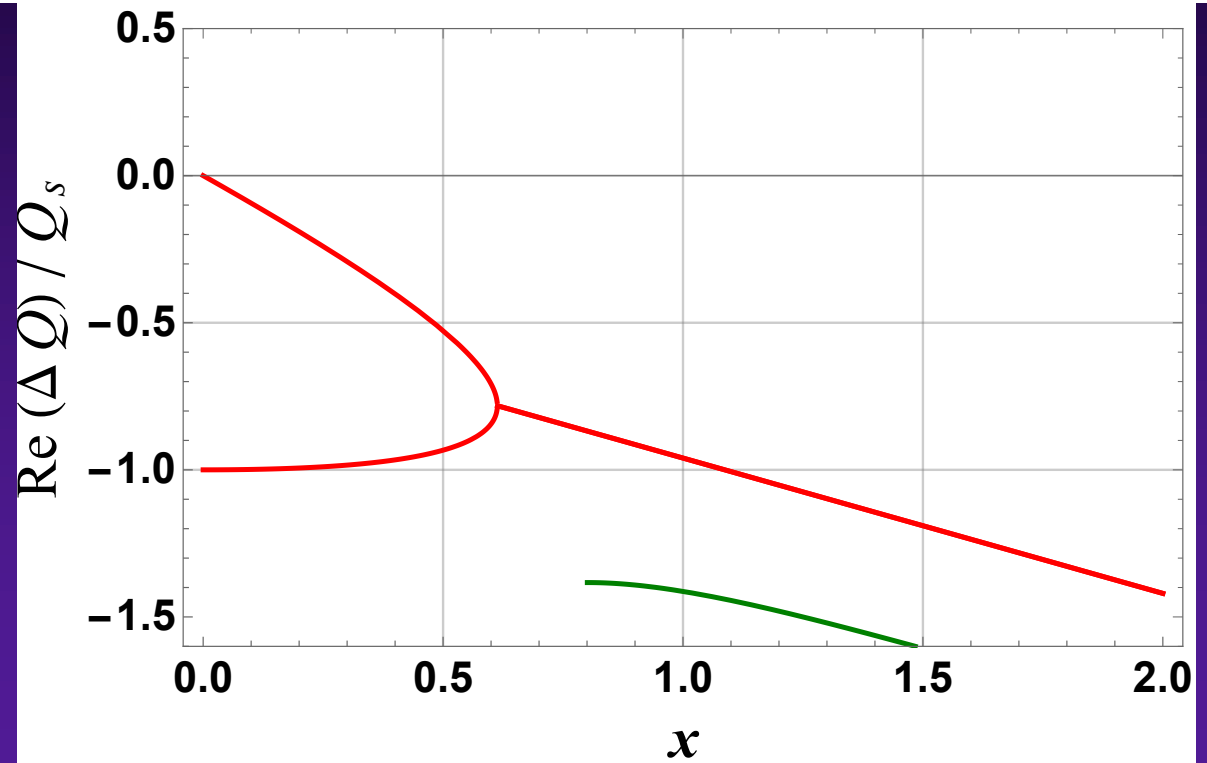
◆ $\Delta q = 1.0$
(update)



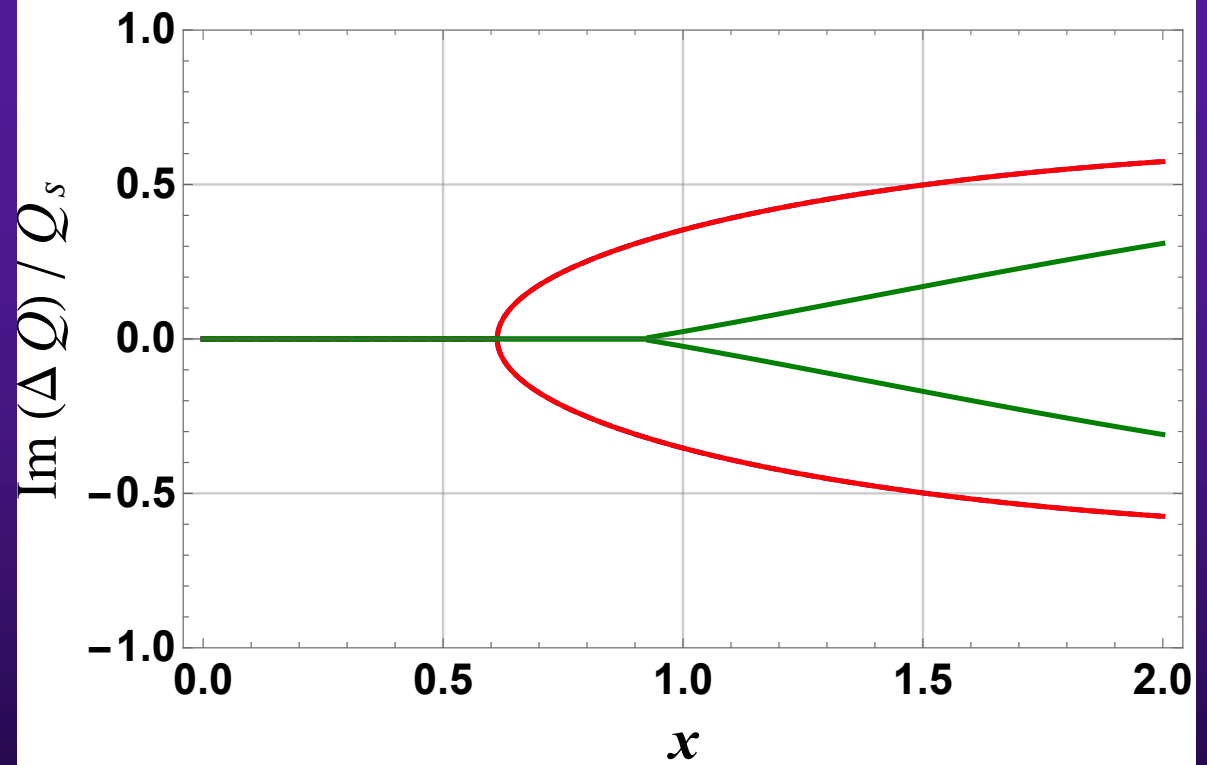
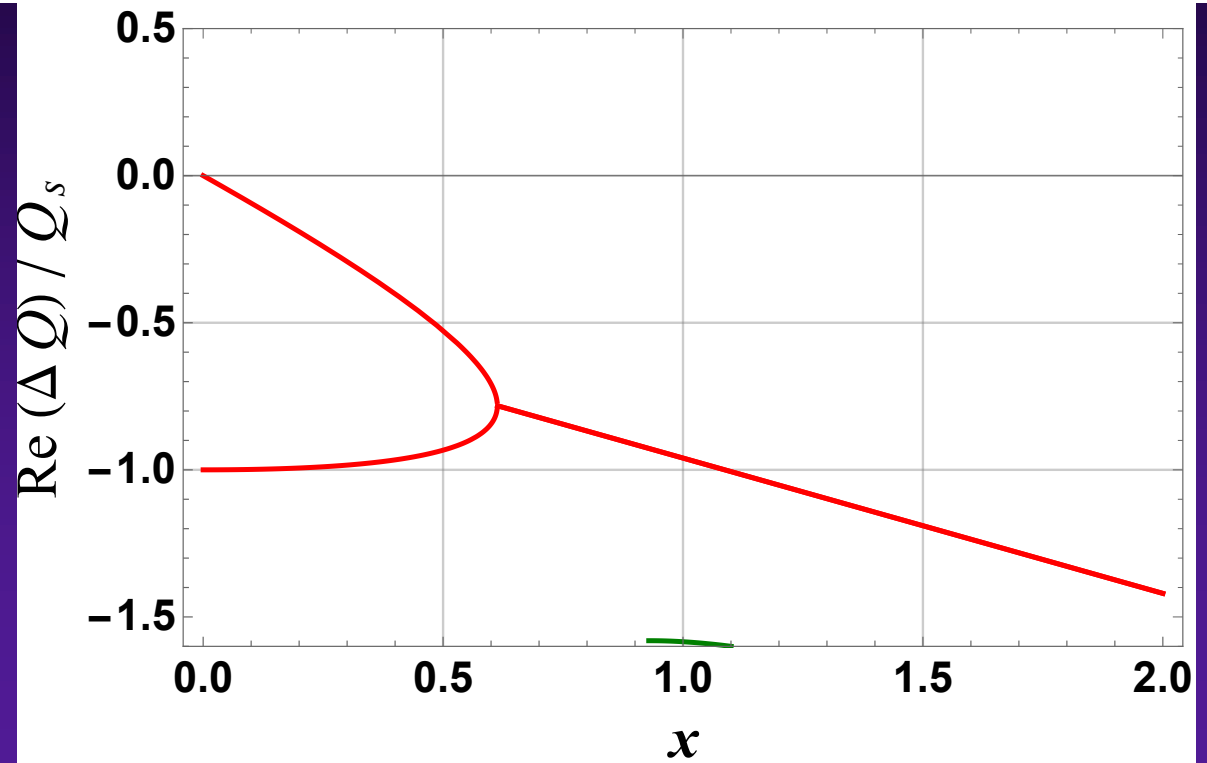
◆ $\Delta q = 1.2$
(update)



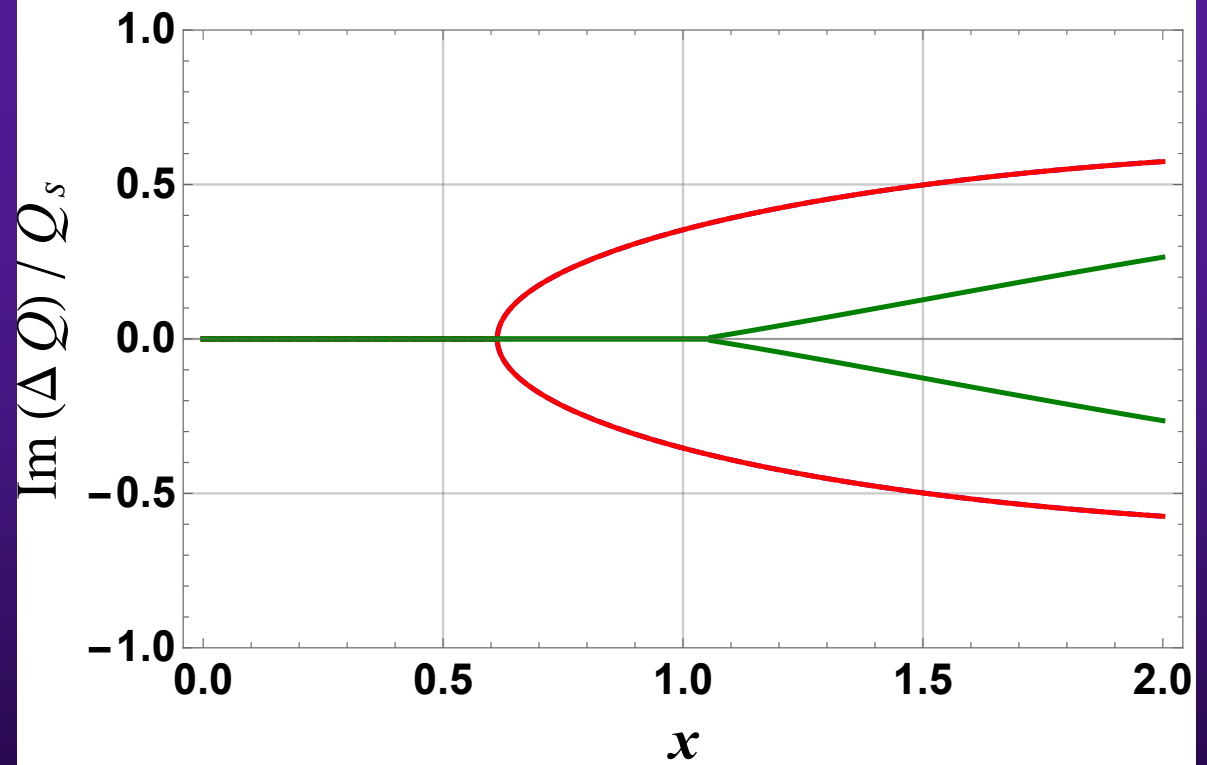
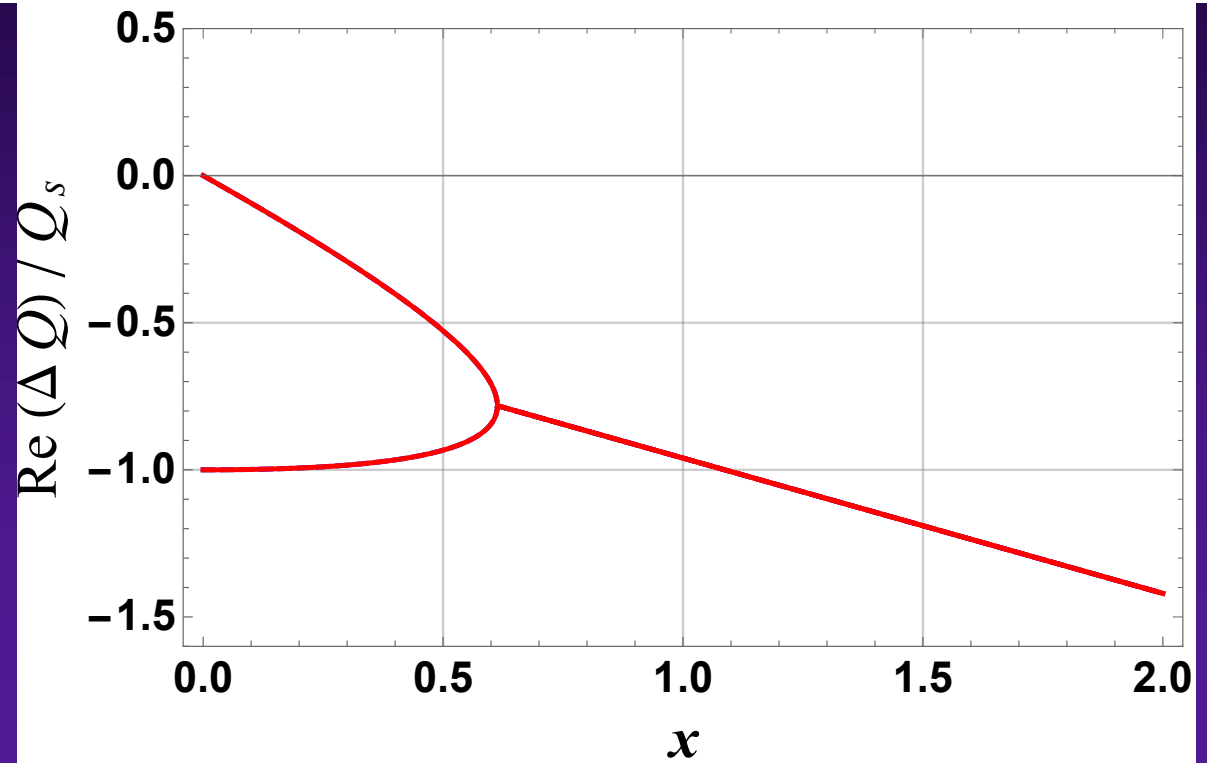
◆ $\Delta q = 1.4$
(update)



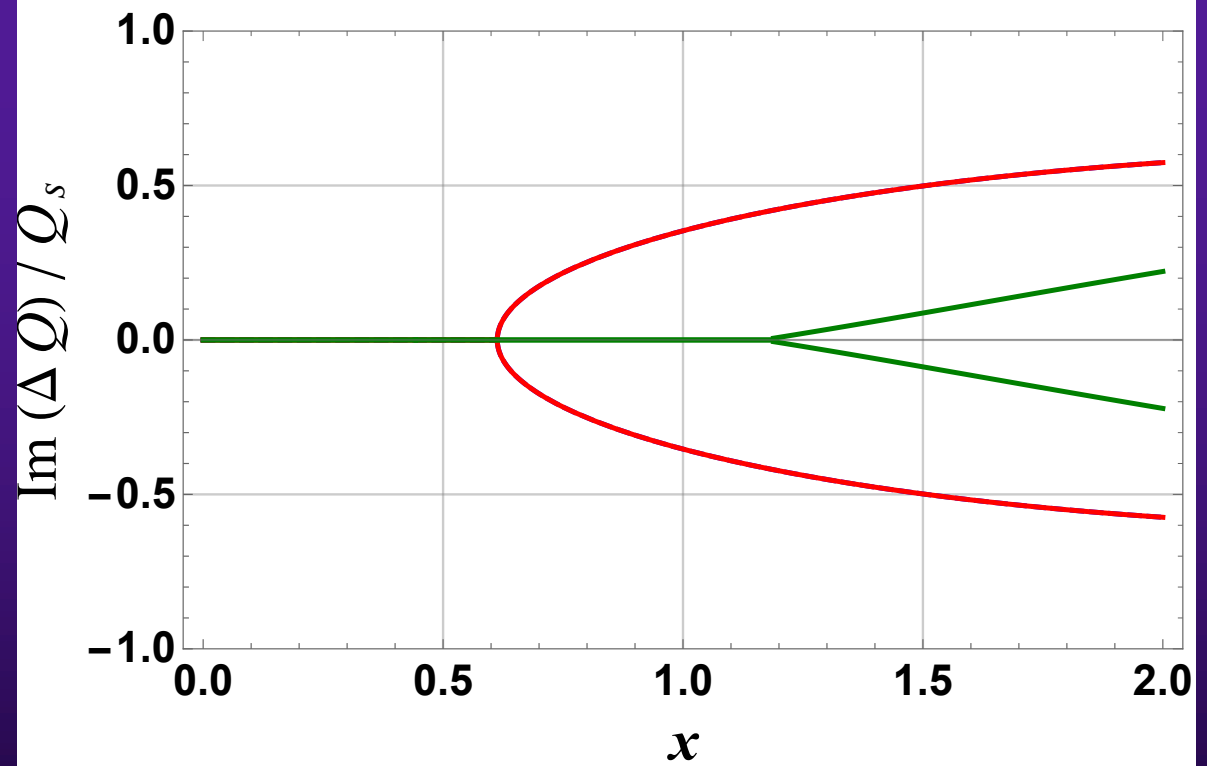
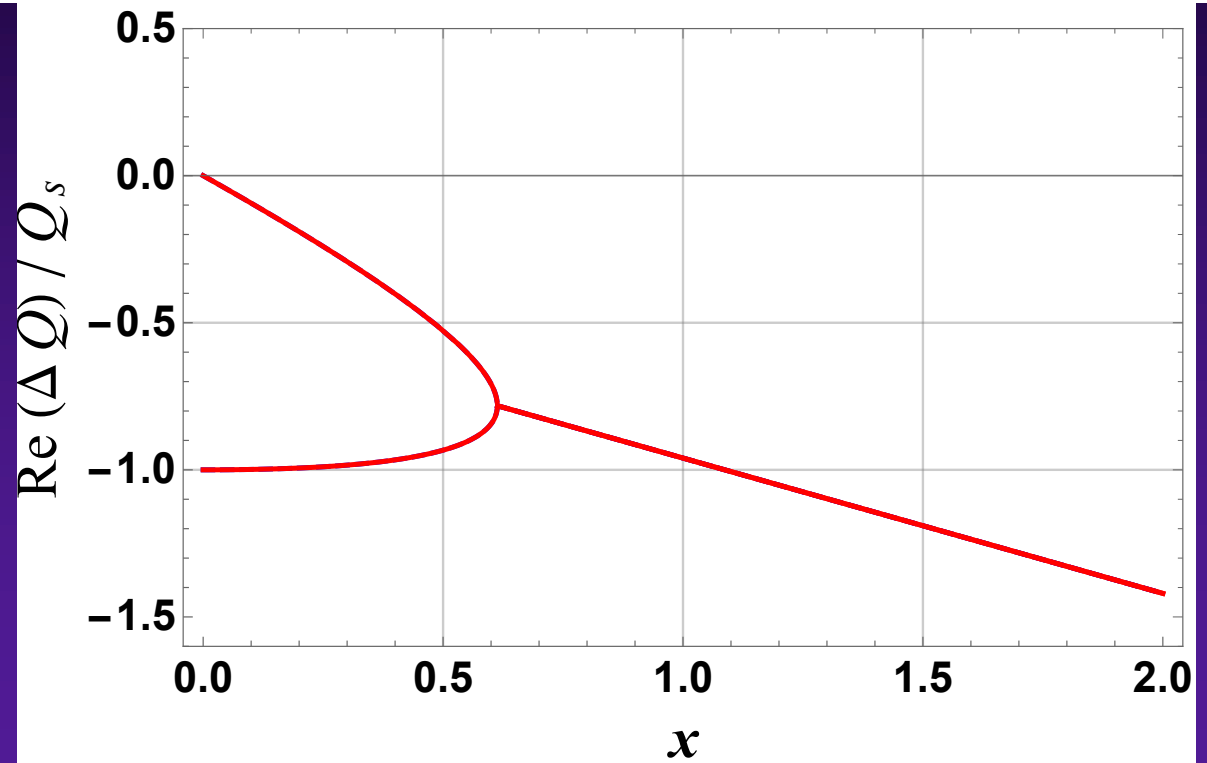
◆ $\Delta q = 1.6$
(update)



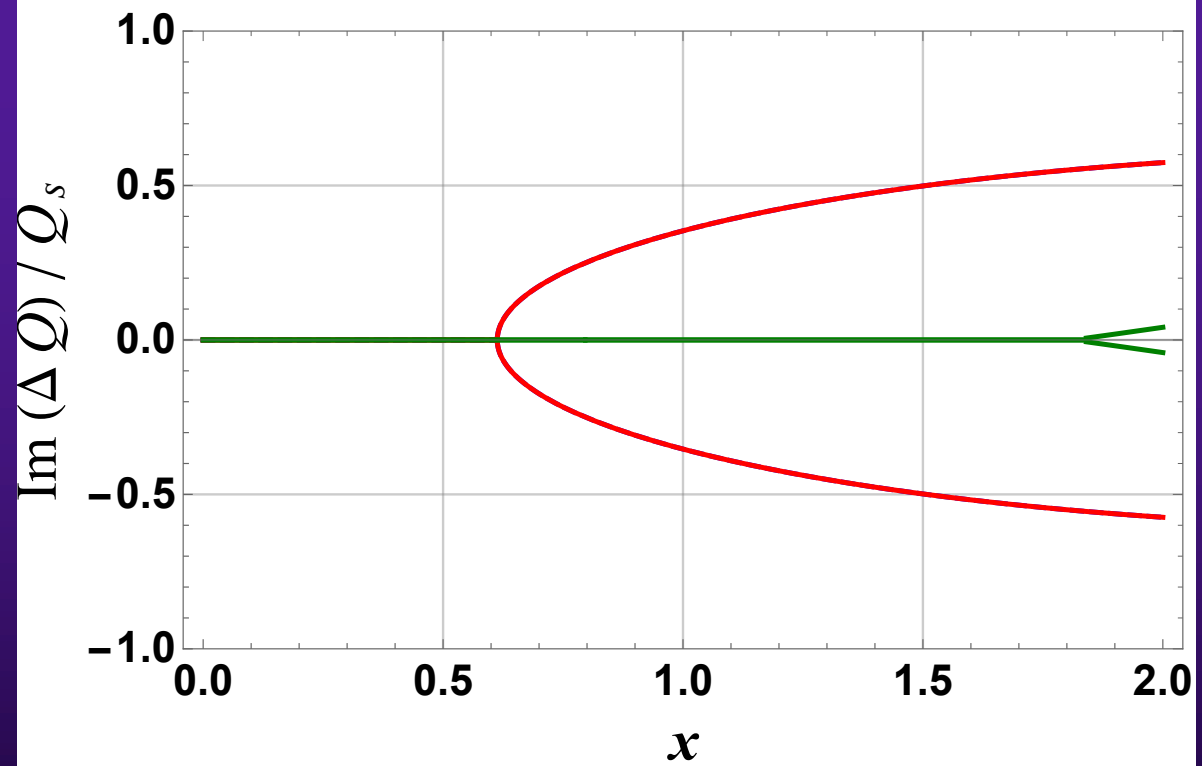
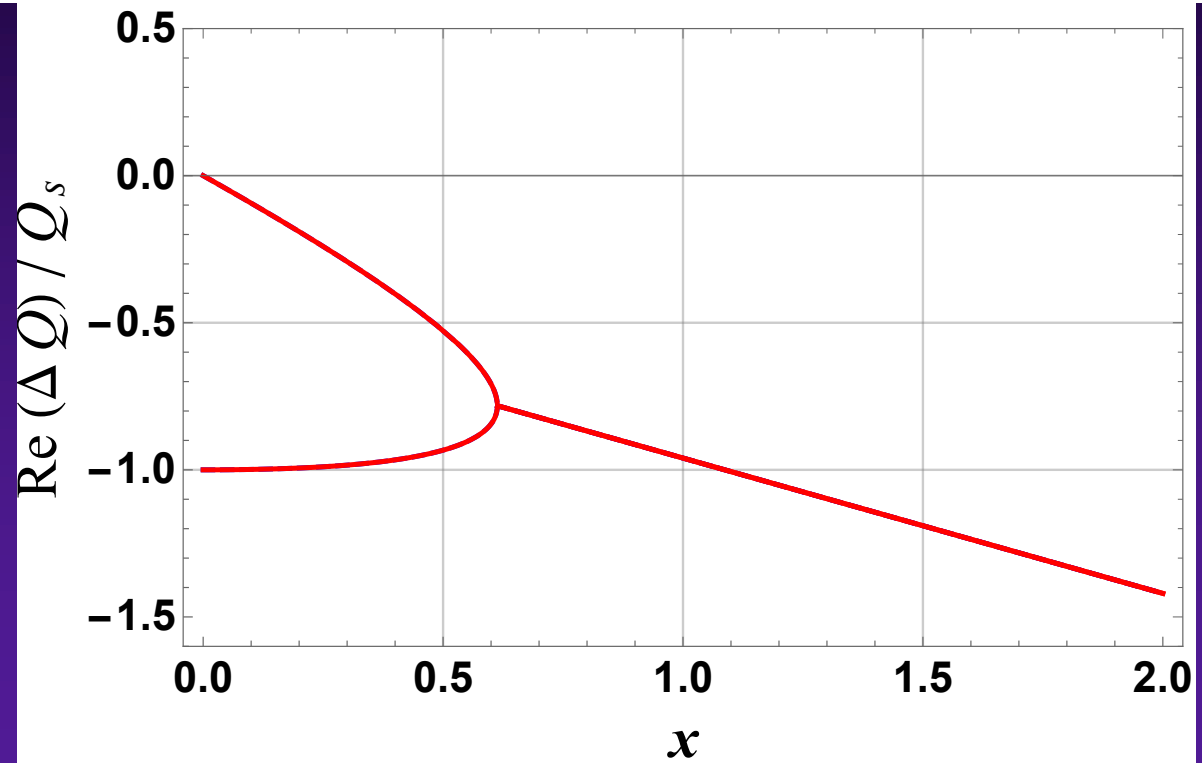
◆ $\Delta q = 1.8$
(update)



◆ $\Delta q = 2.0$
(update)



◆ $\Delta q = 3.0$
(update)

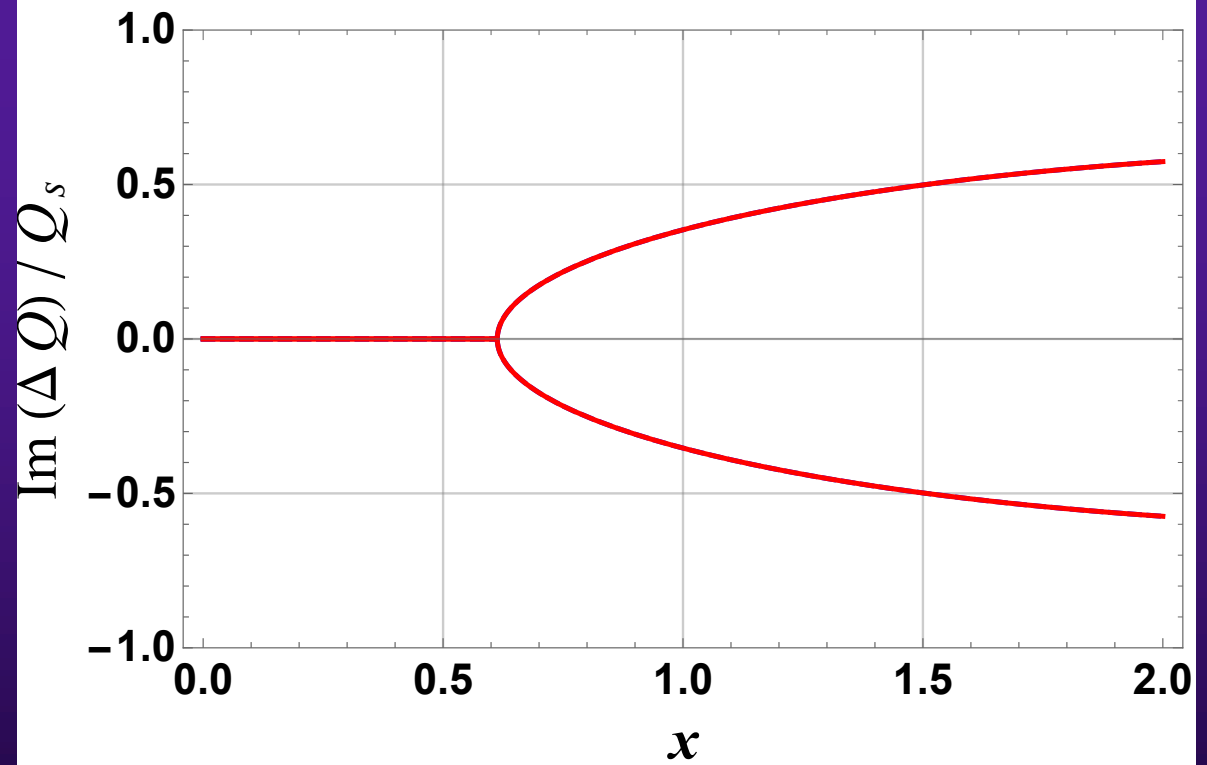
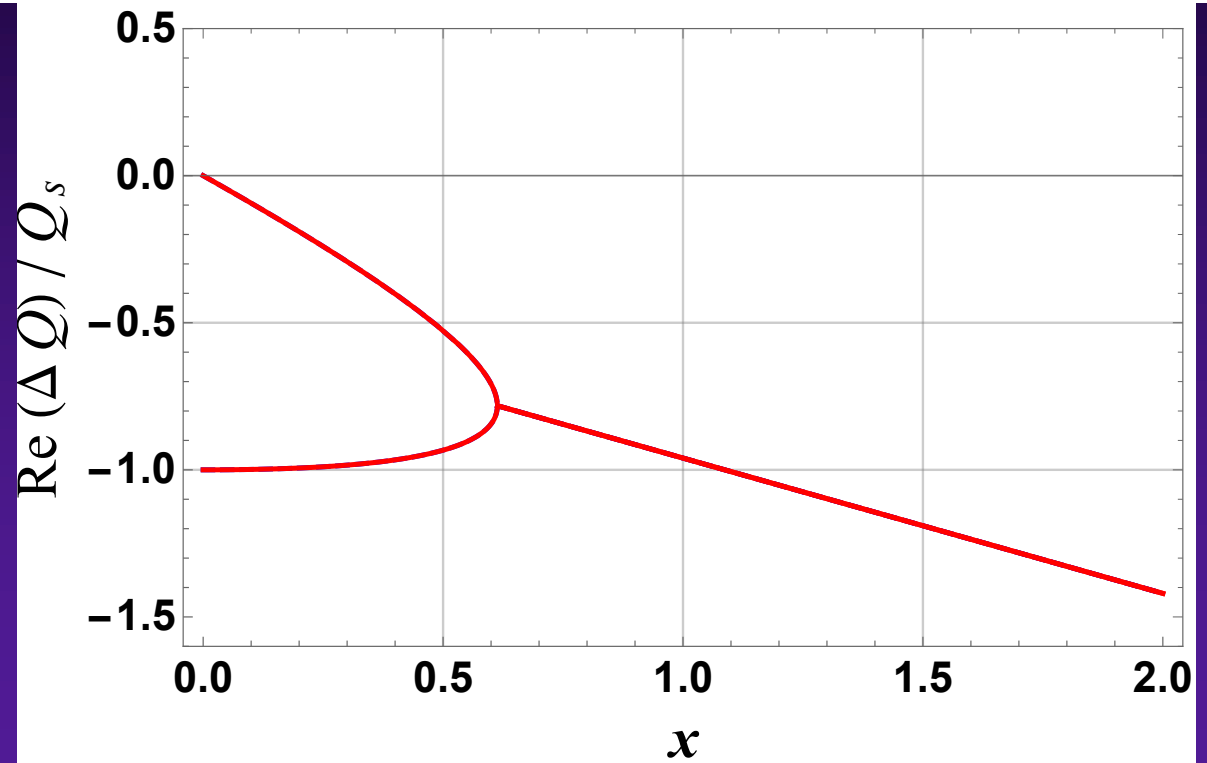


Conclusion and next step

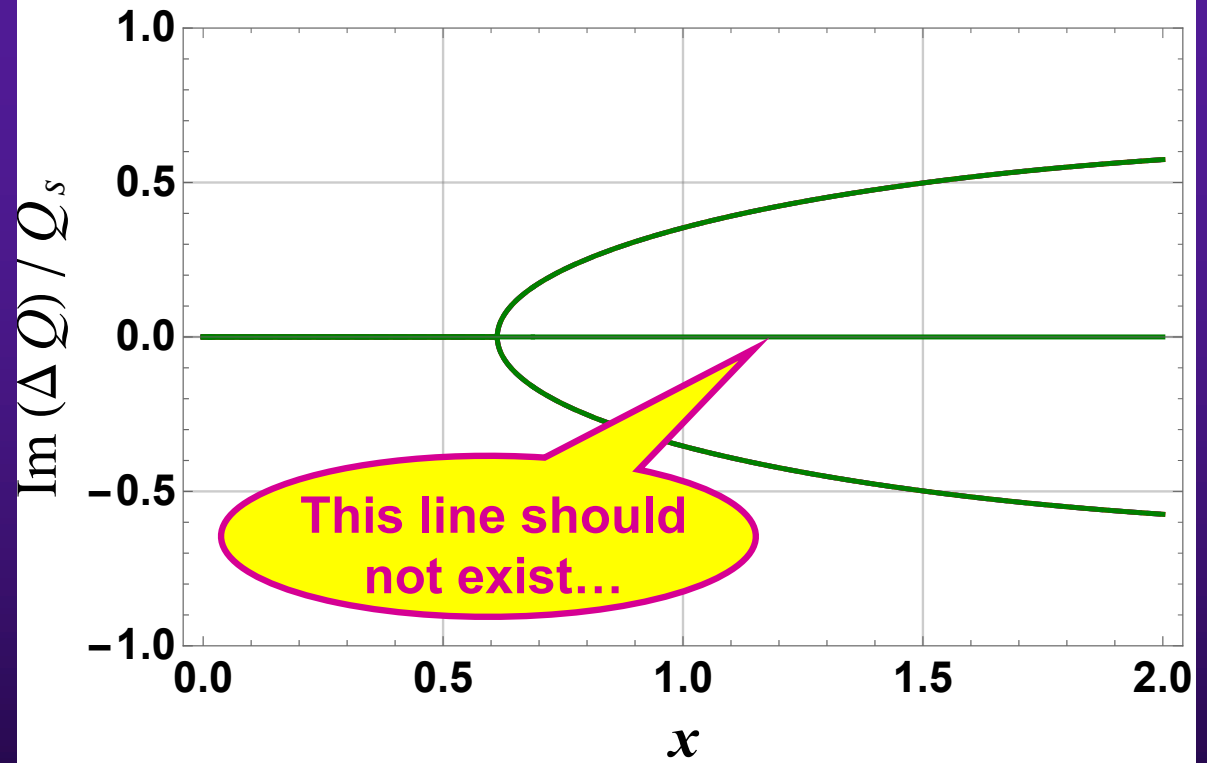
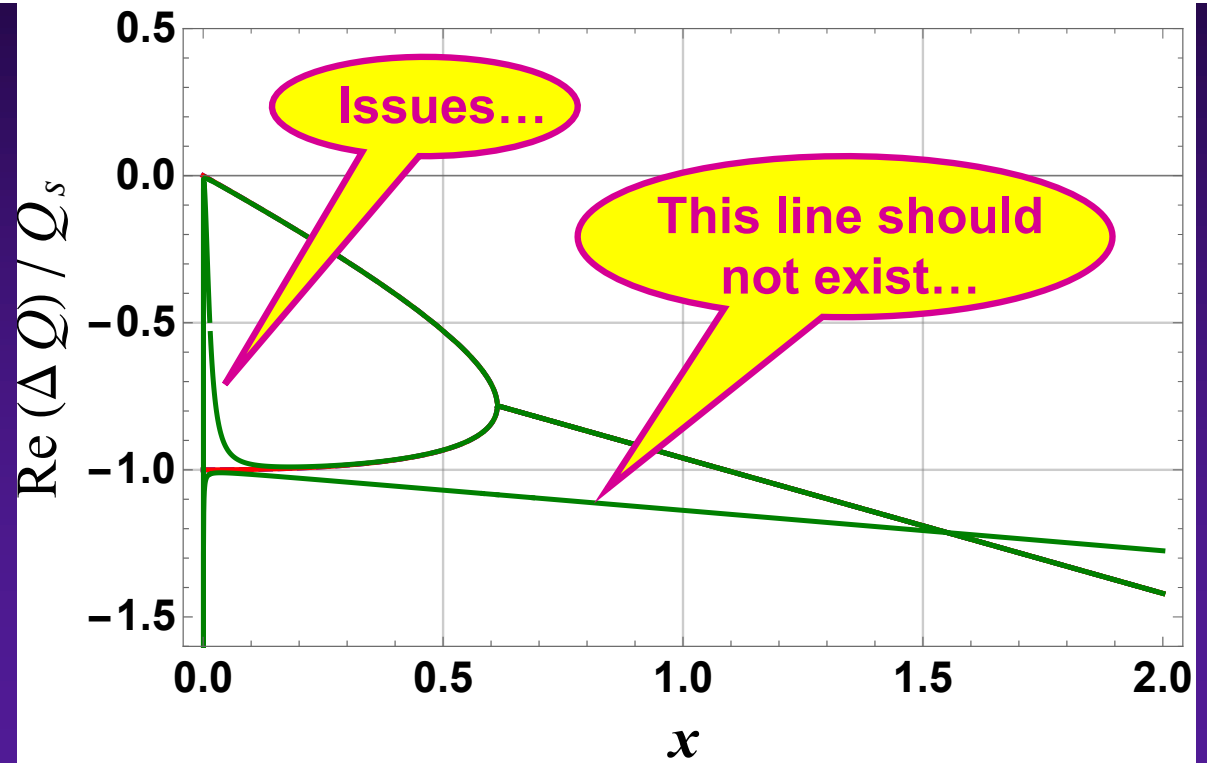
- ◆ **Increasing the tune spread first reduces the TMCI intensity threshold** => By a factor ~ 2 for $\Delta q \approx 0.5$, i.e. half of the synchrotron tune (considering an elliptical distribution)
- ◆ **Then, the TMCI intensity threshold increases again to reach \sim the same threshold for $\Delta q \approx 1$** => To increase the TMCI intensity threshold we need $\Delta q \geq 1$, i.e. a tune spread larger than \sim the synchrotron tune
- ◆ **The TMCI intensity threshold is a factor ~ 2 higher for $\Delta q \approx 2$ and a factor ~ 3 higher for $\Delta q \approx 3$**
- ◆ **Next step:** to be checked with DELPHI, pyHEADTAIL, ...

BACK-UP: PAST NUMERICAL ISSUES

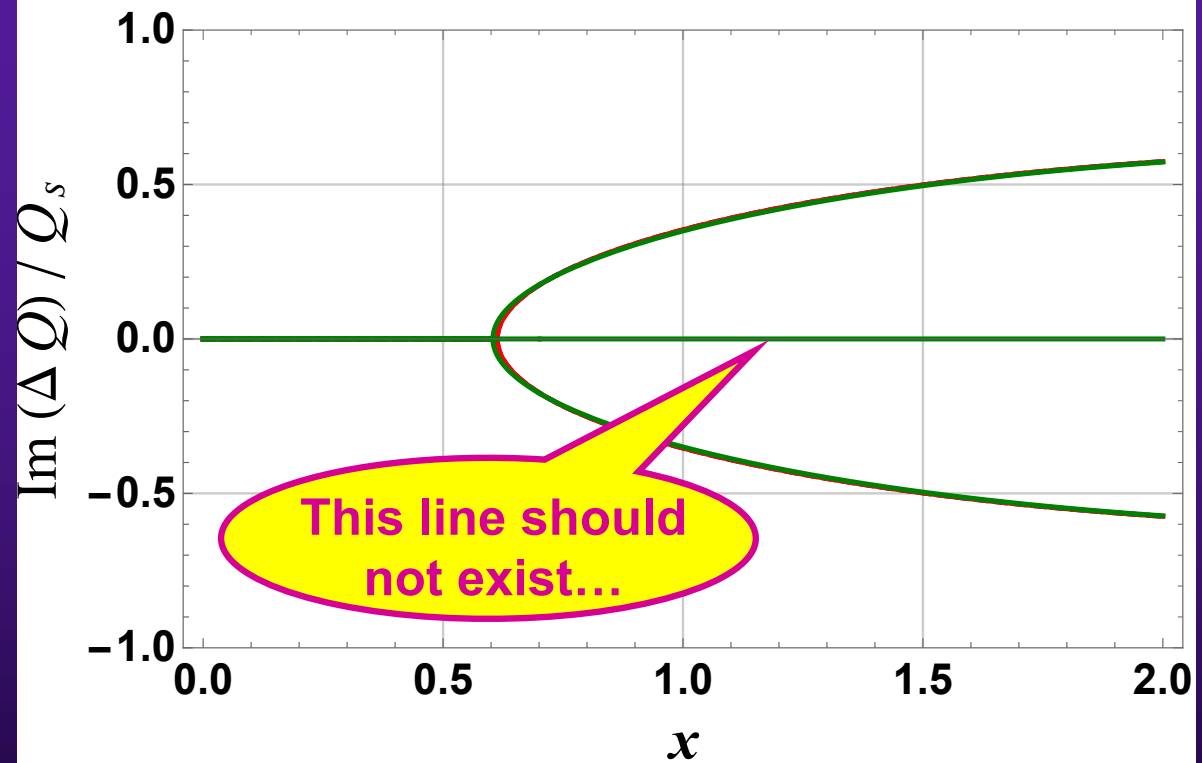
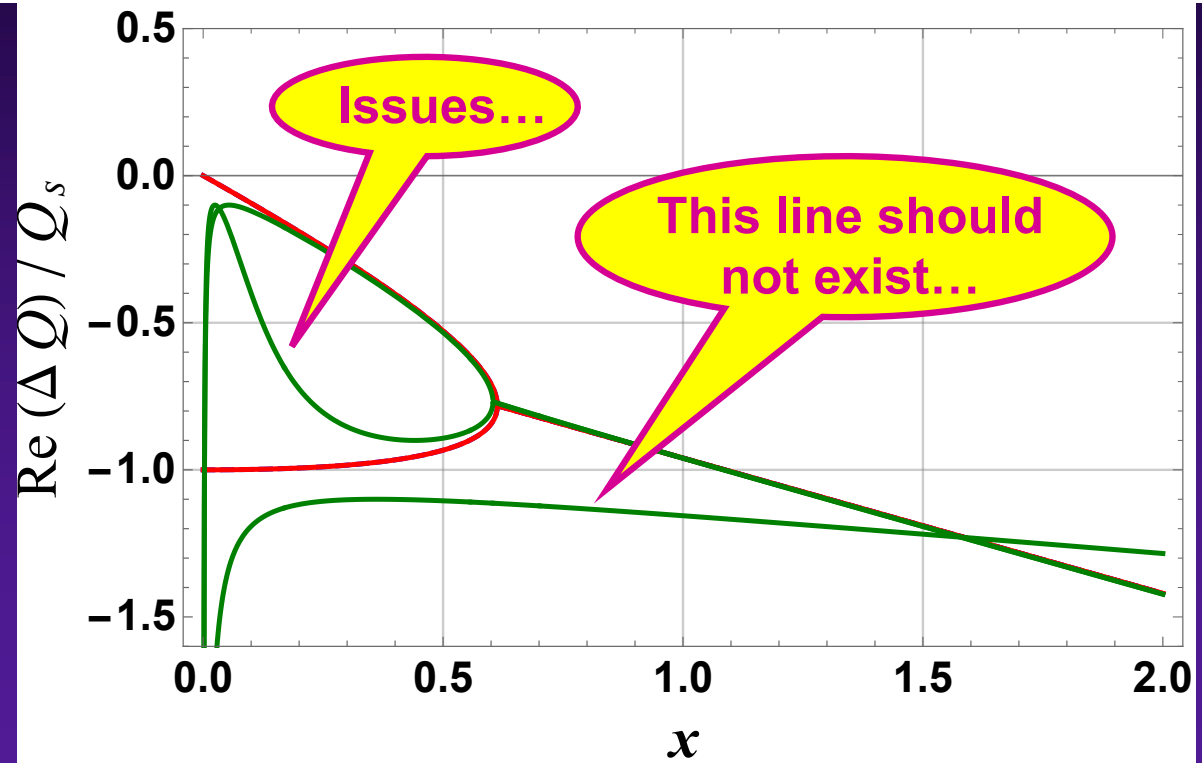
◆ $\Delta q = 0$



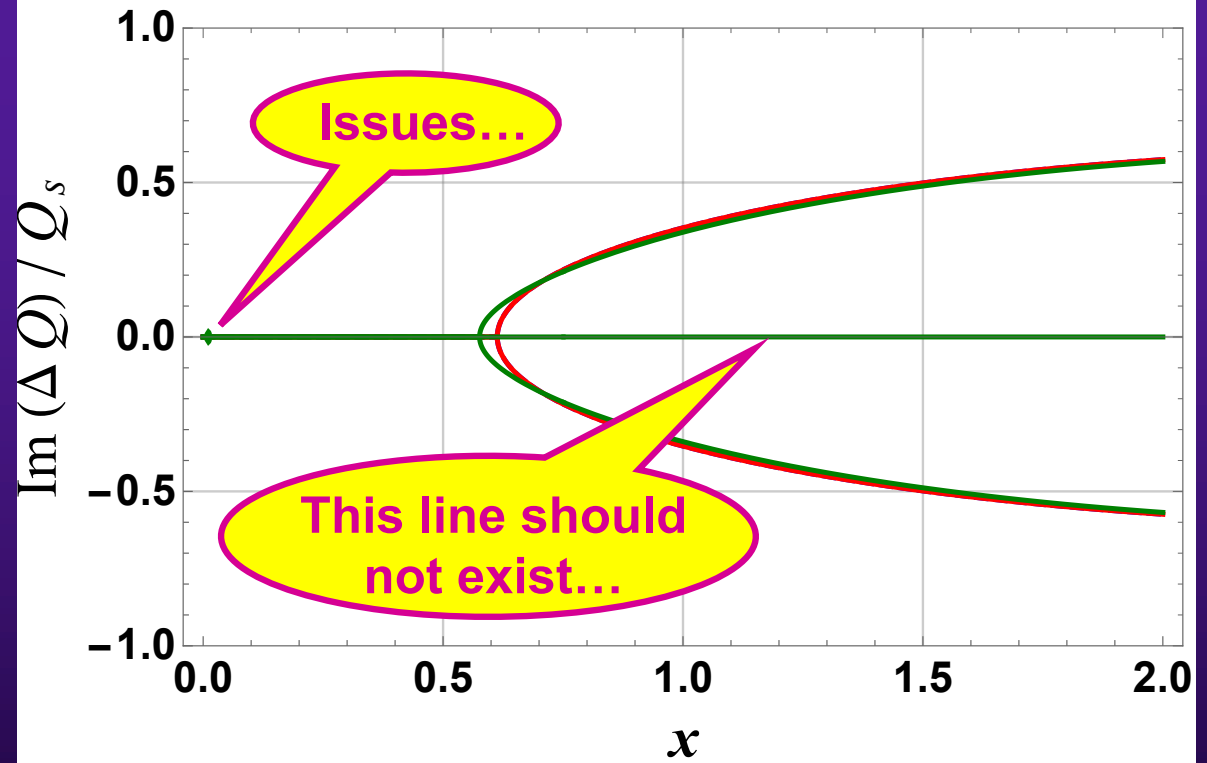
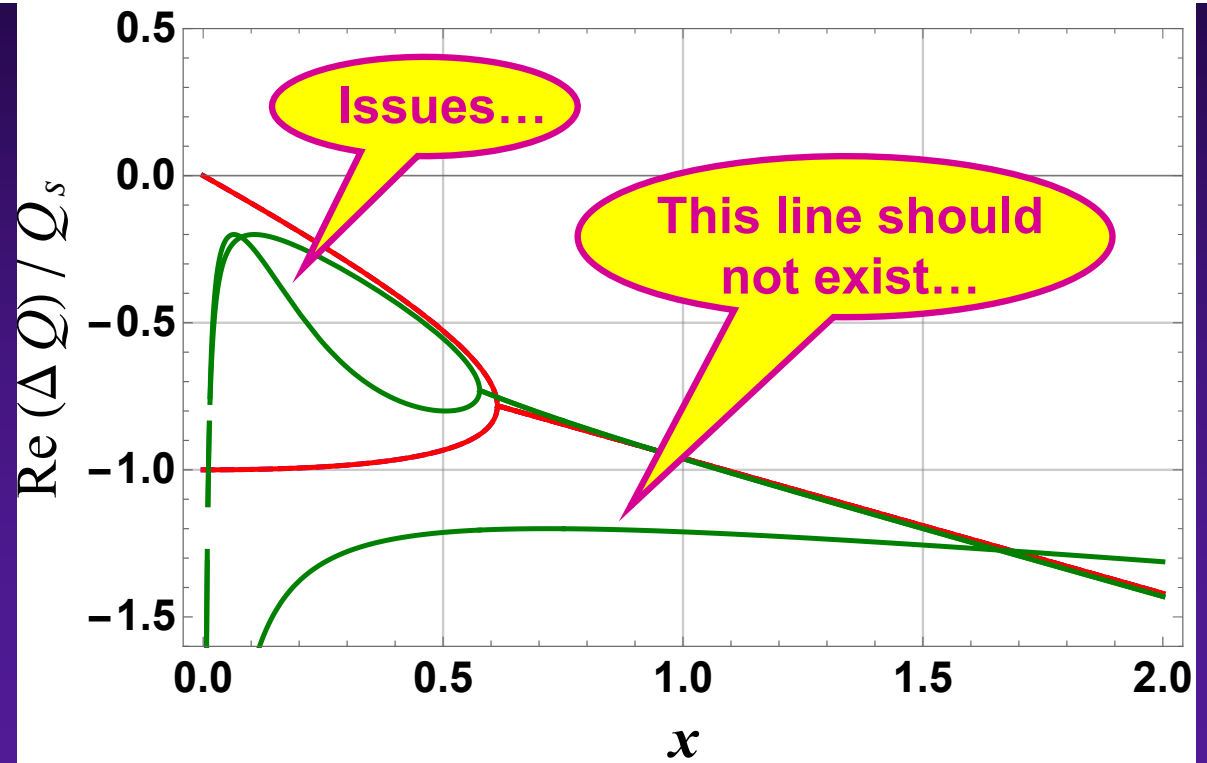
◆ $\Delta q = 0.01$



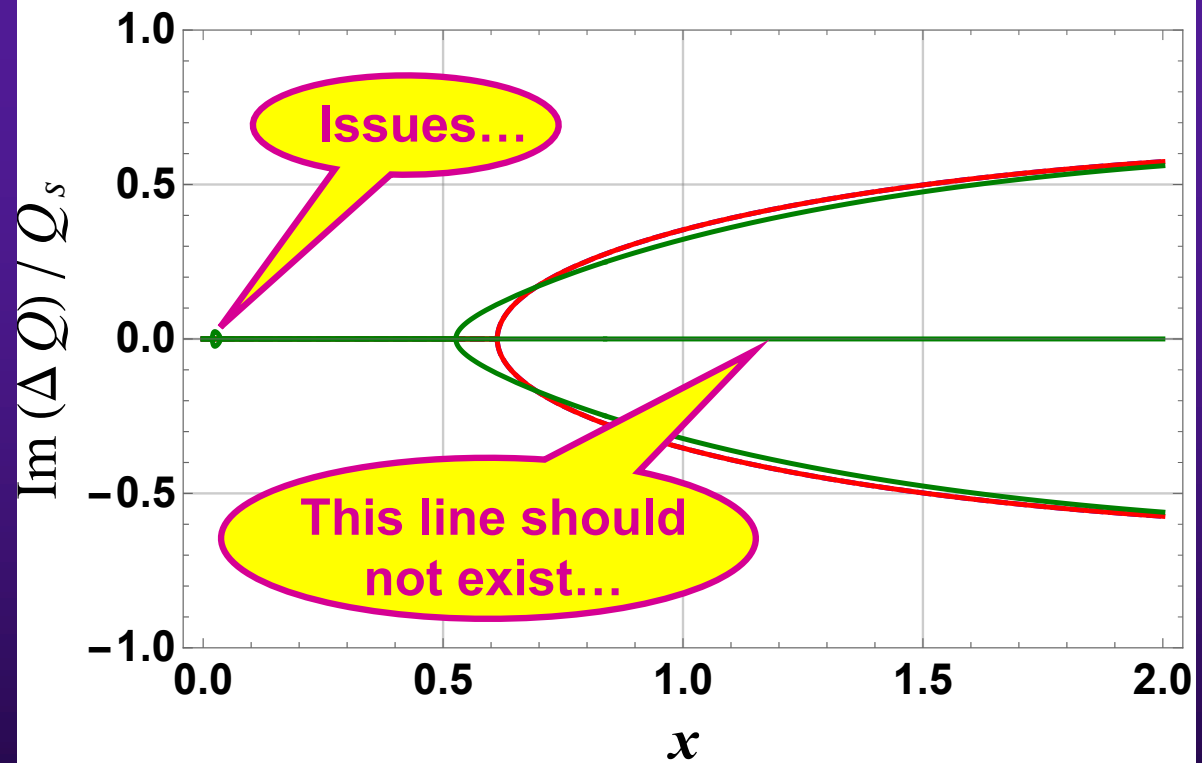
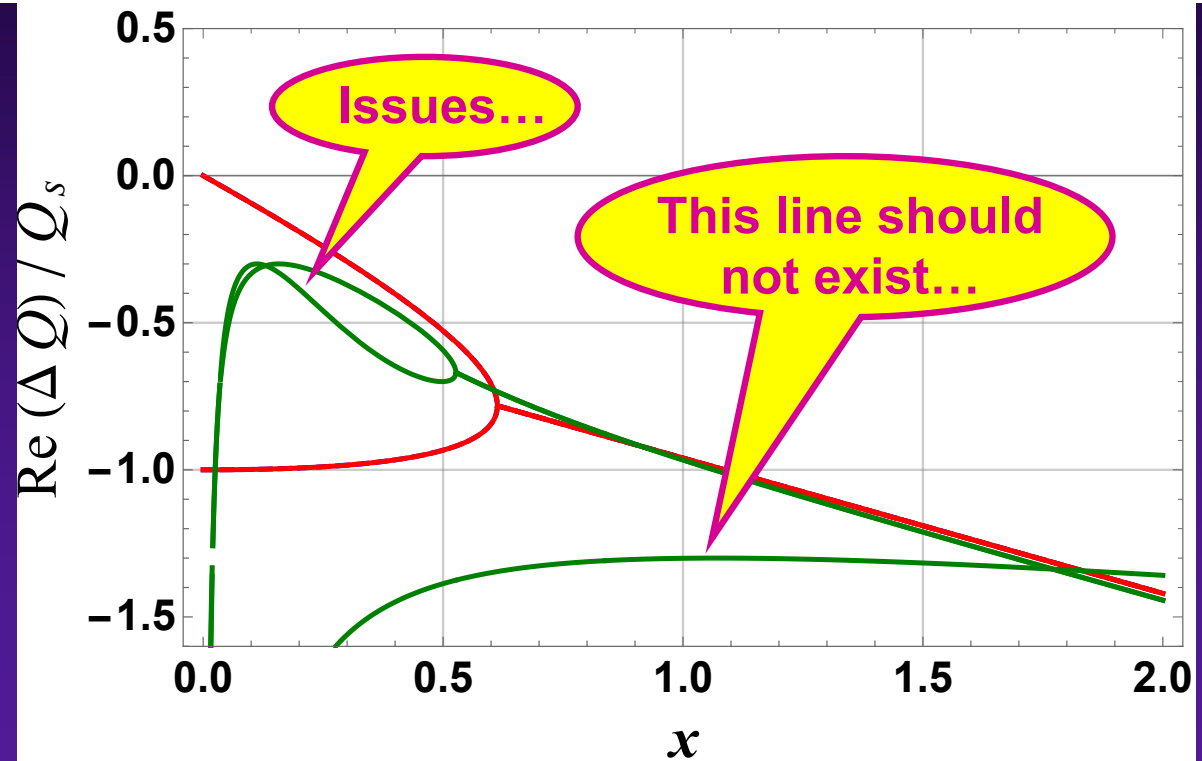
◆ $\Delta q = 0.1$



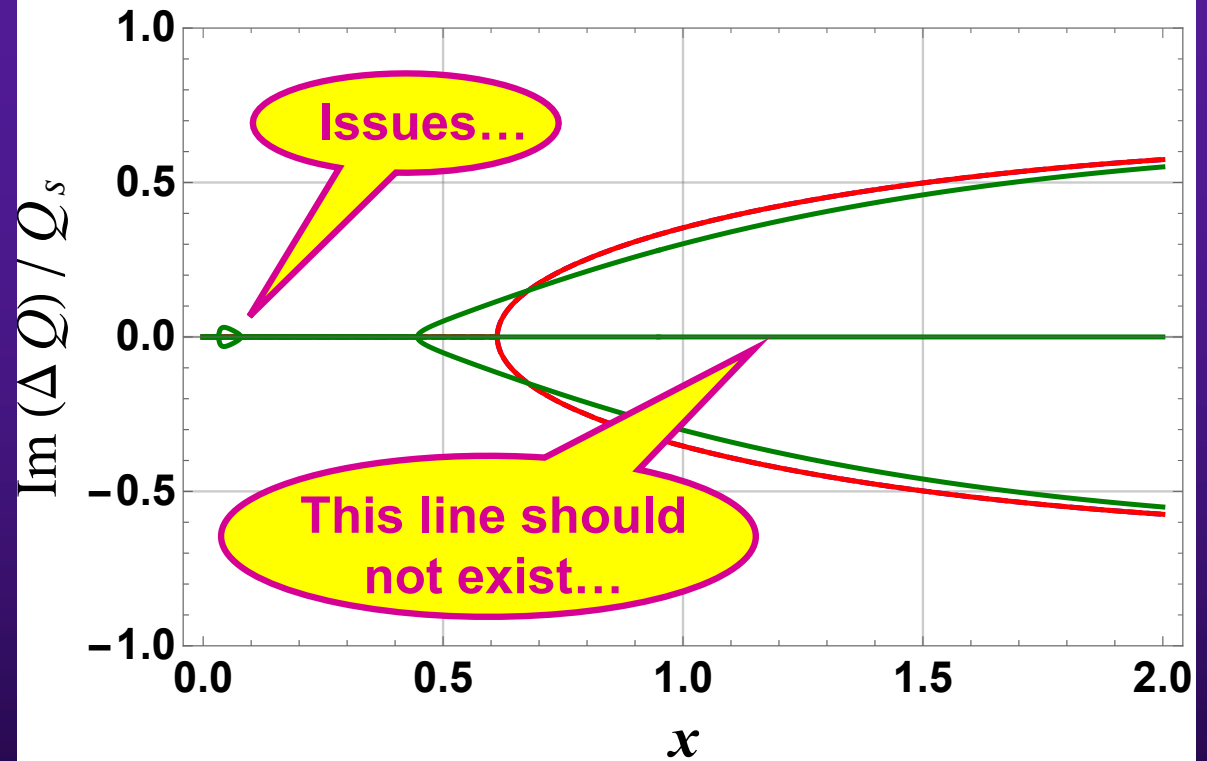
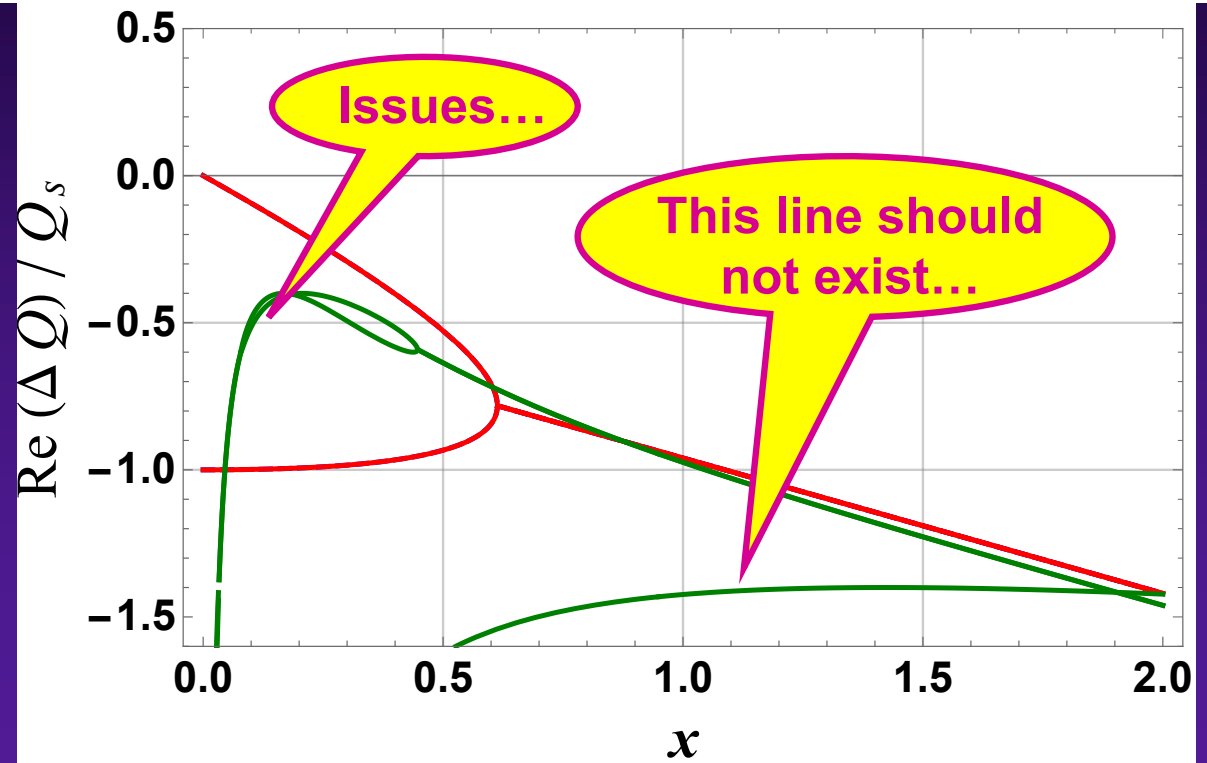
◆ $\Delta q = 0.2$



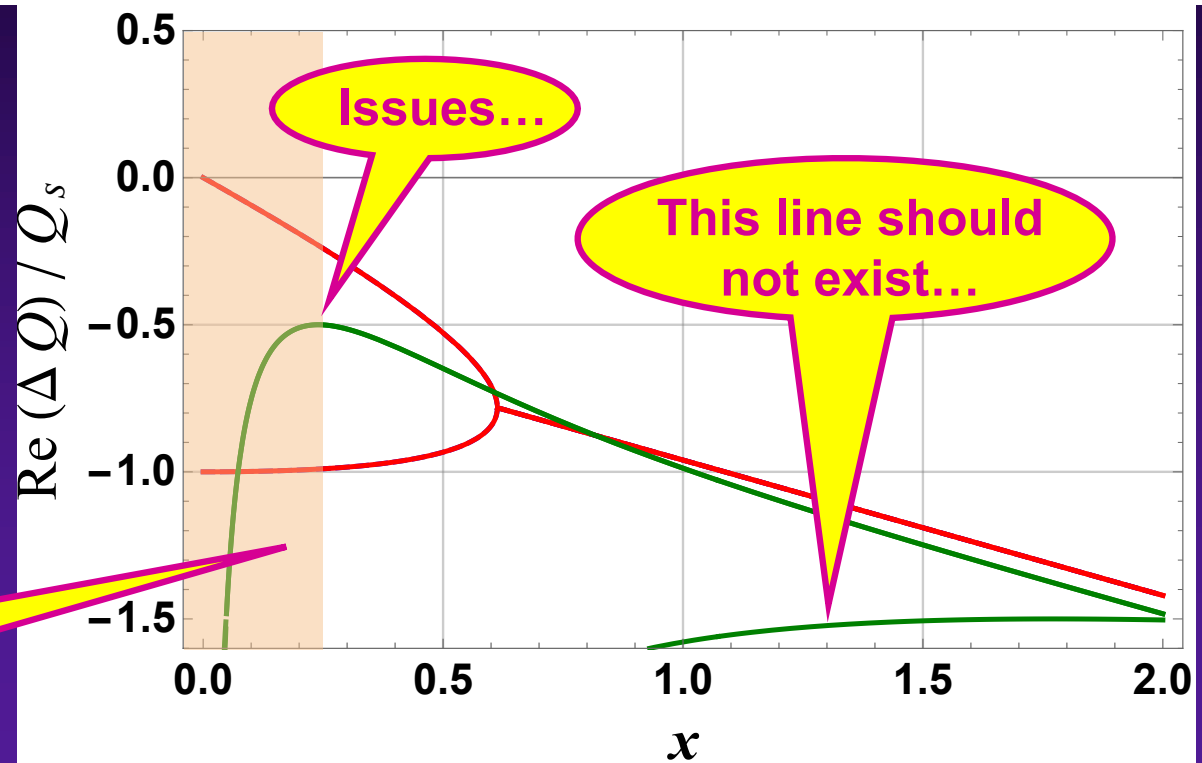
◆ $\Delta q = 0.3$



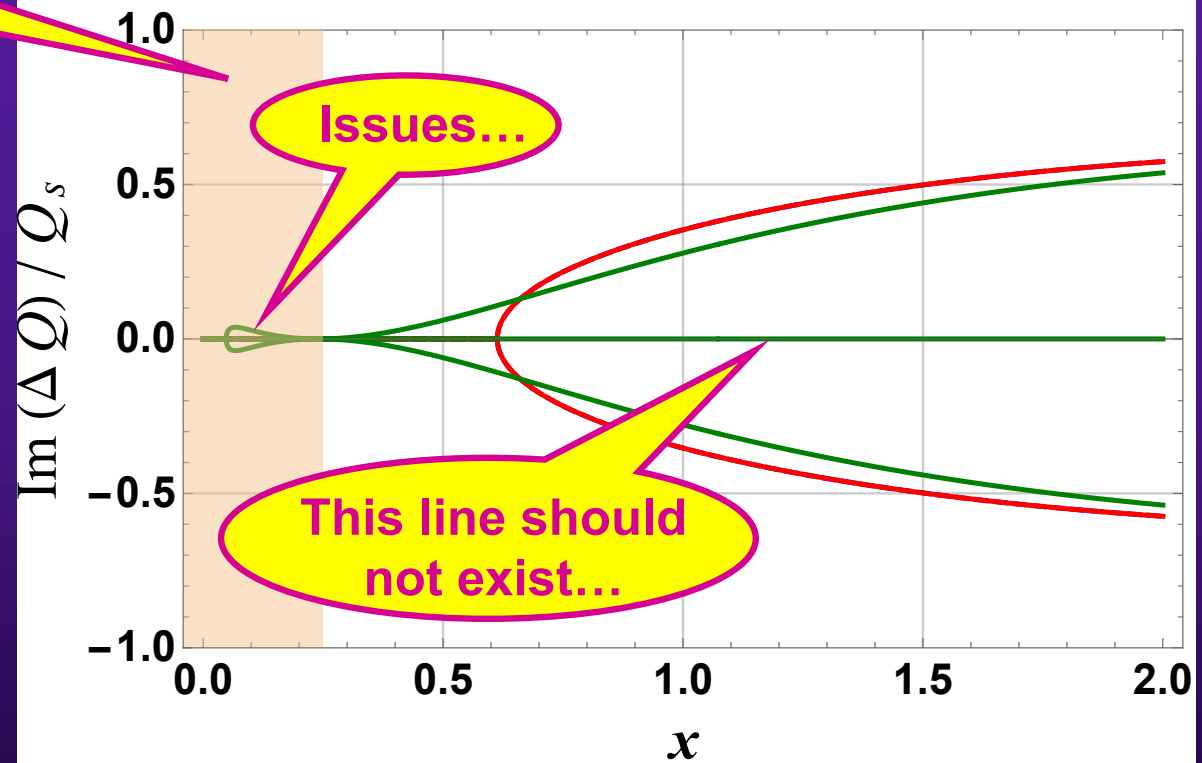
◆ $\Delta q = 0.4$



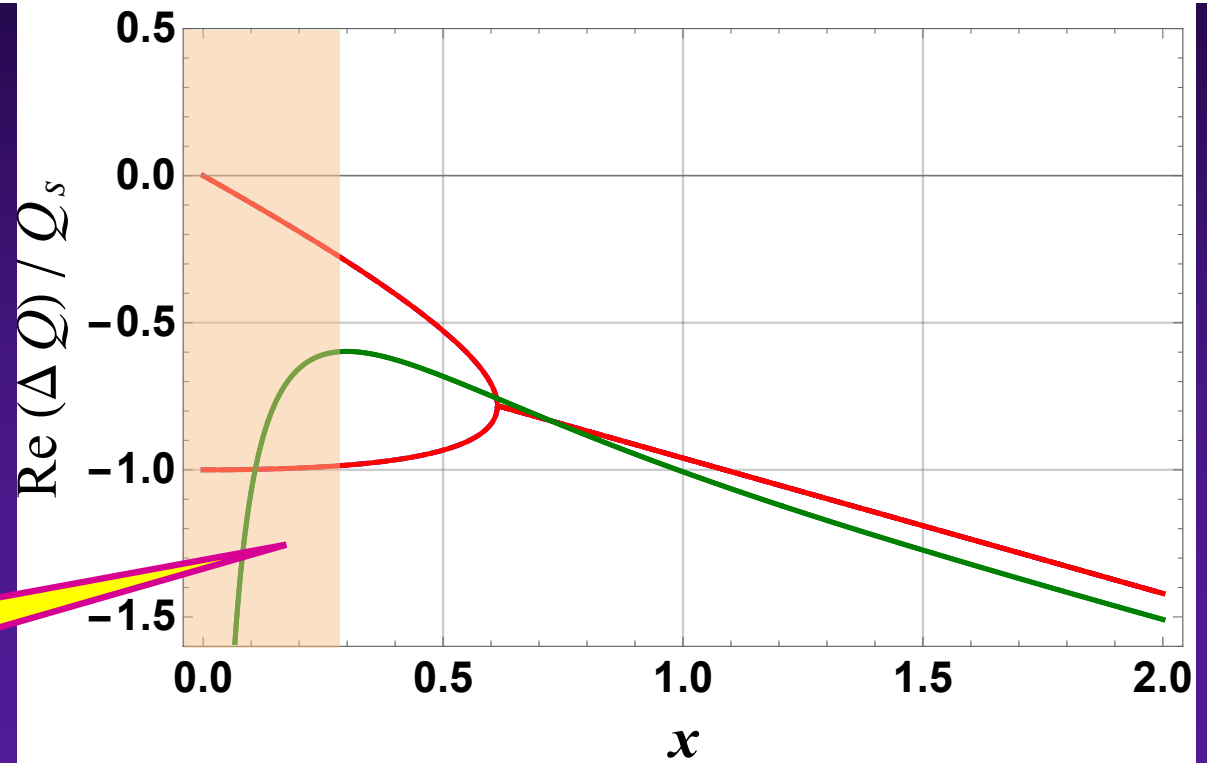
◆ $\Delta q = 0.5$



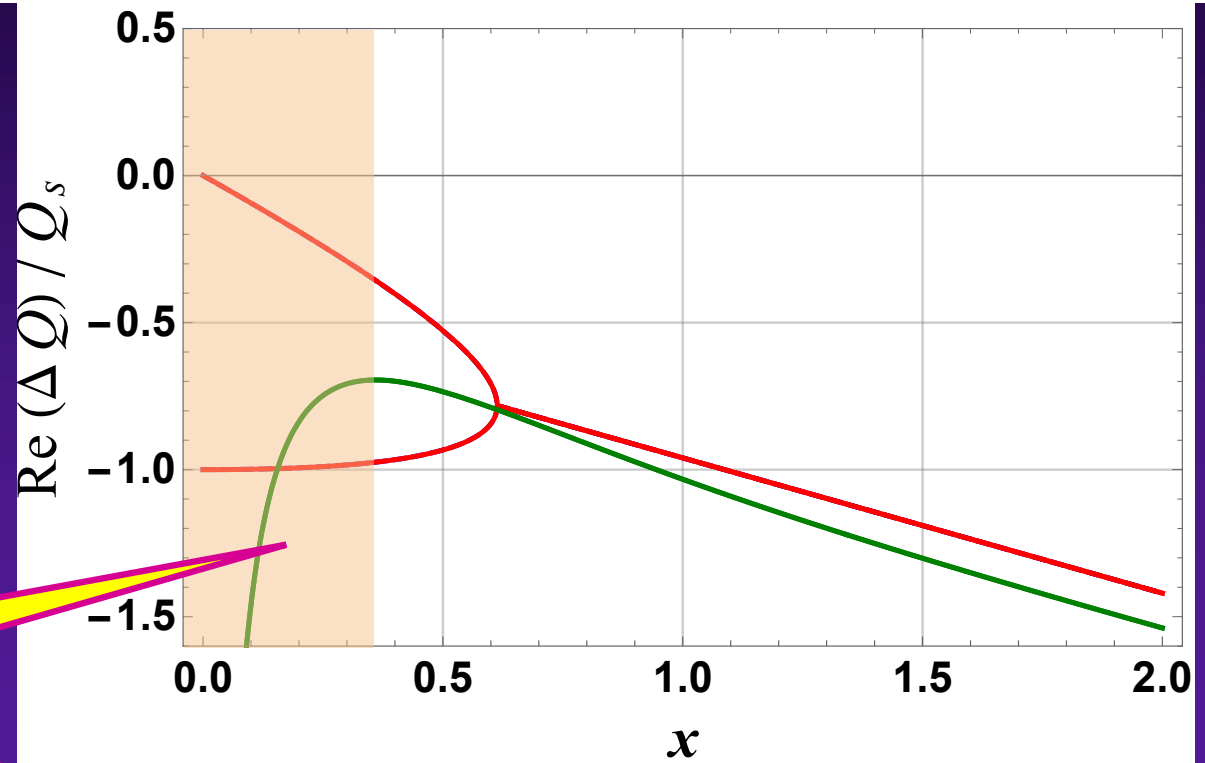
Parts to be removed...



◆ $\Delta q = 0.6$



◆ $\Delta q = 0.7$



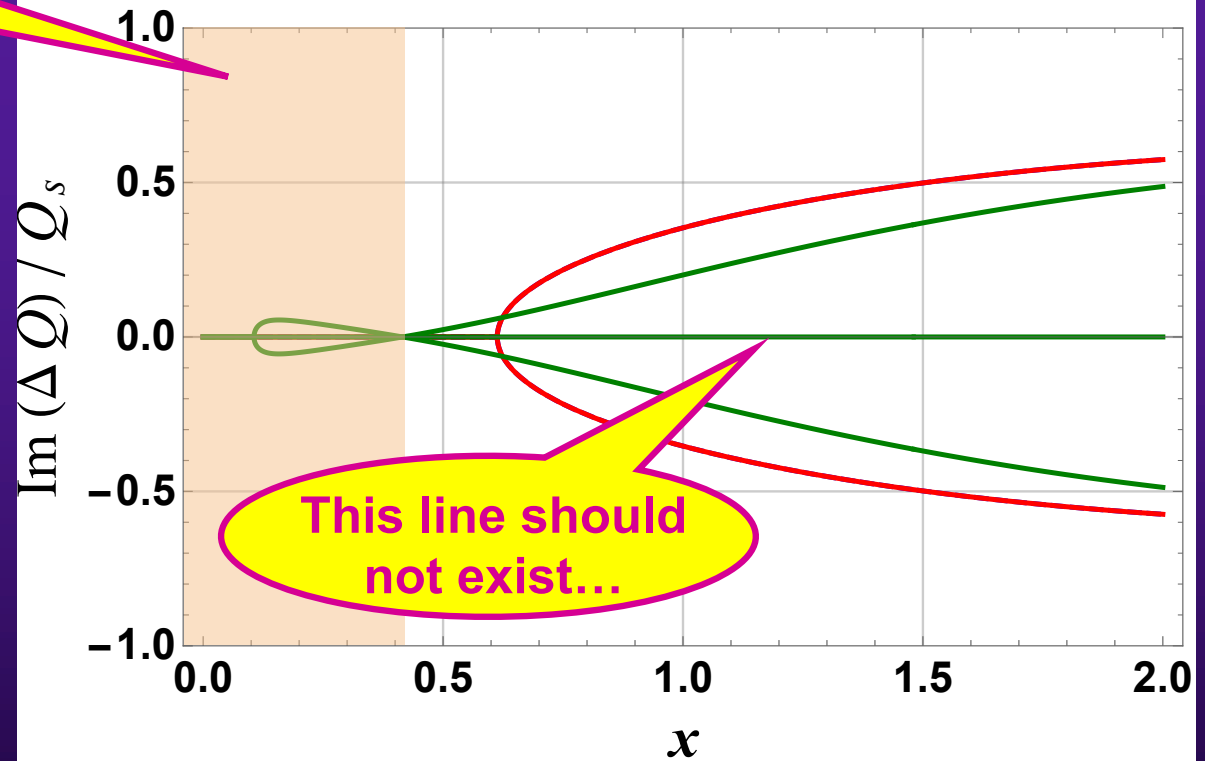
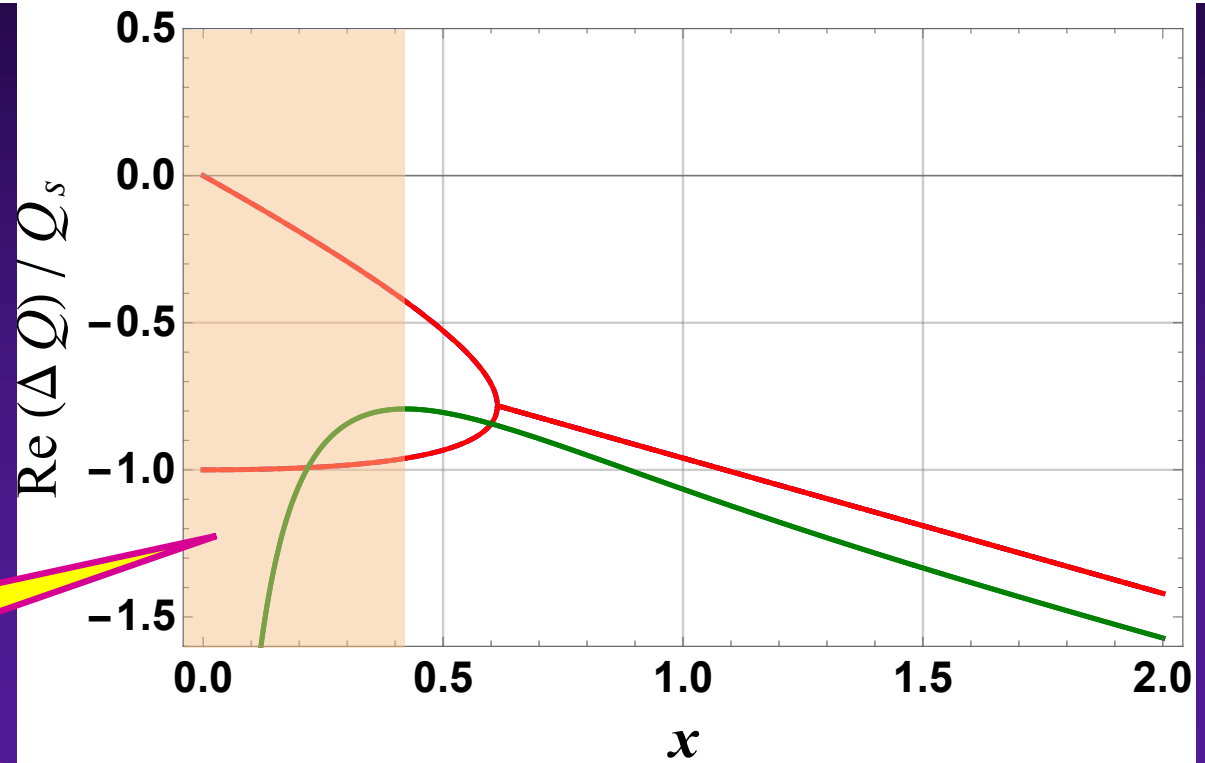
Parts to be removed...



This line should not exist...

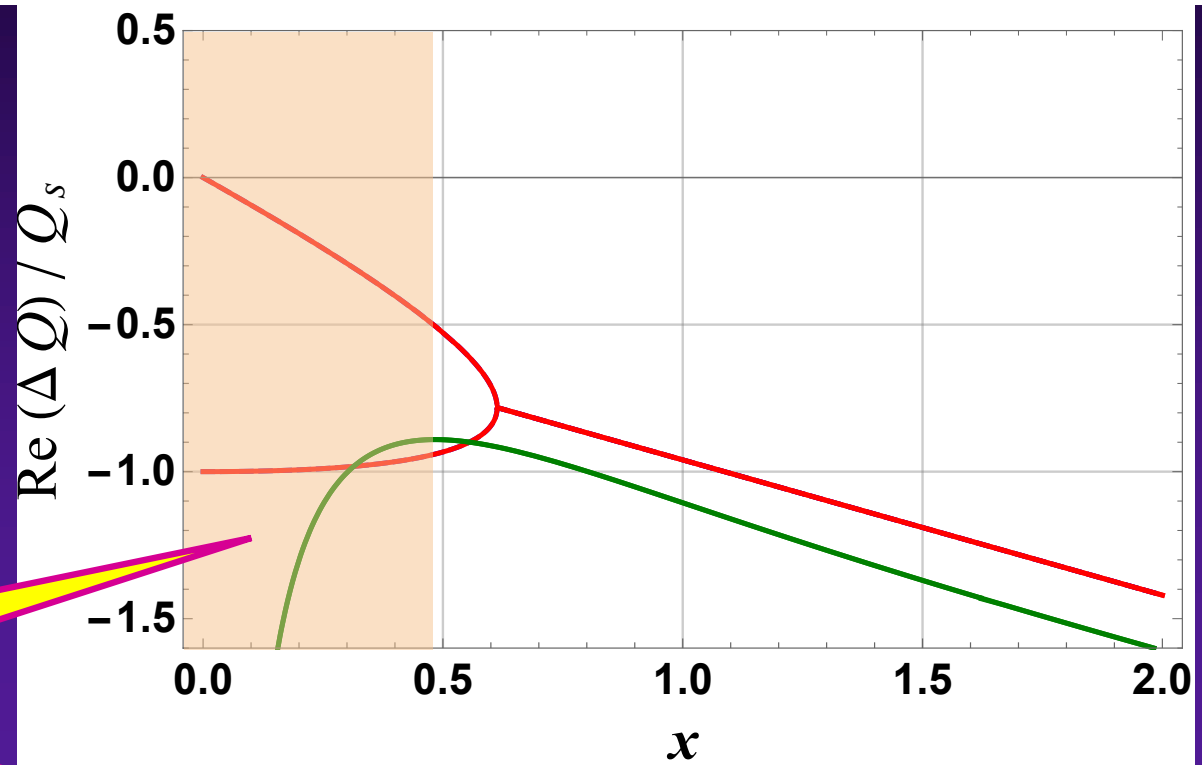
◆ $\Delta q = 0.8$

Parts to be removed...



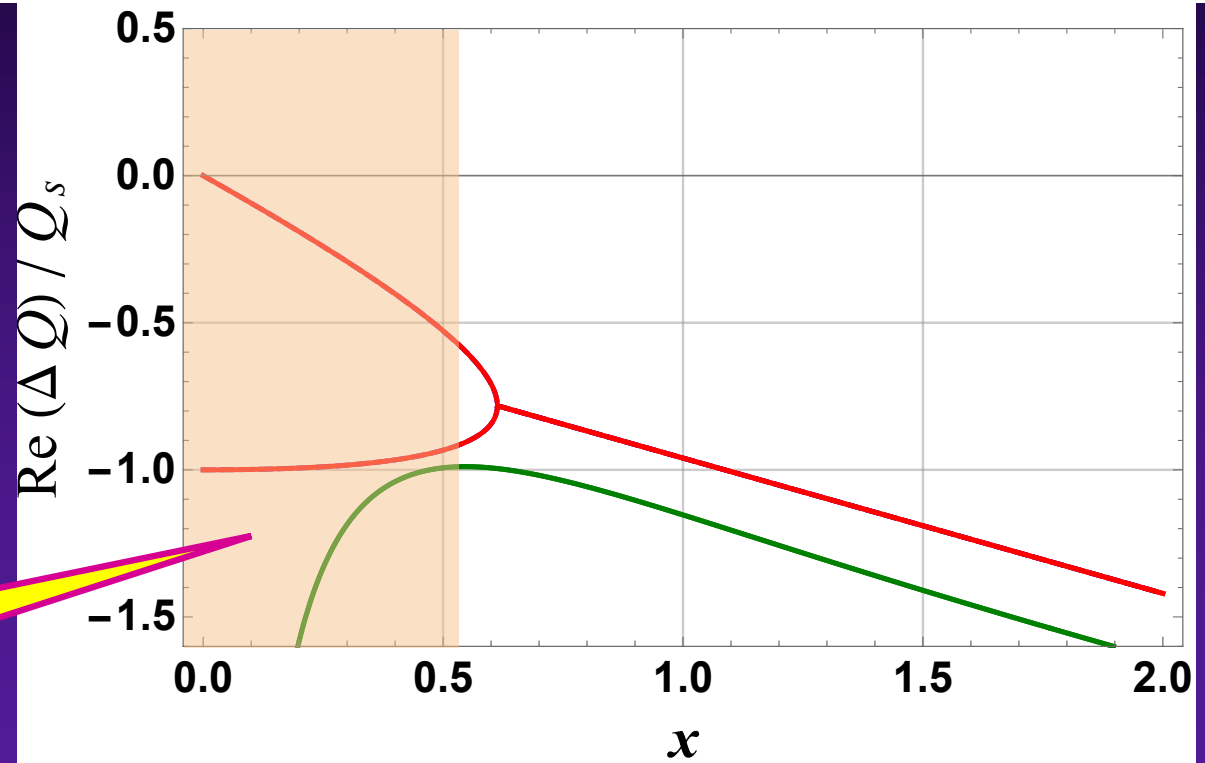
This line should not exist...

◆ $\Delta q = 0.9$



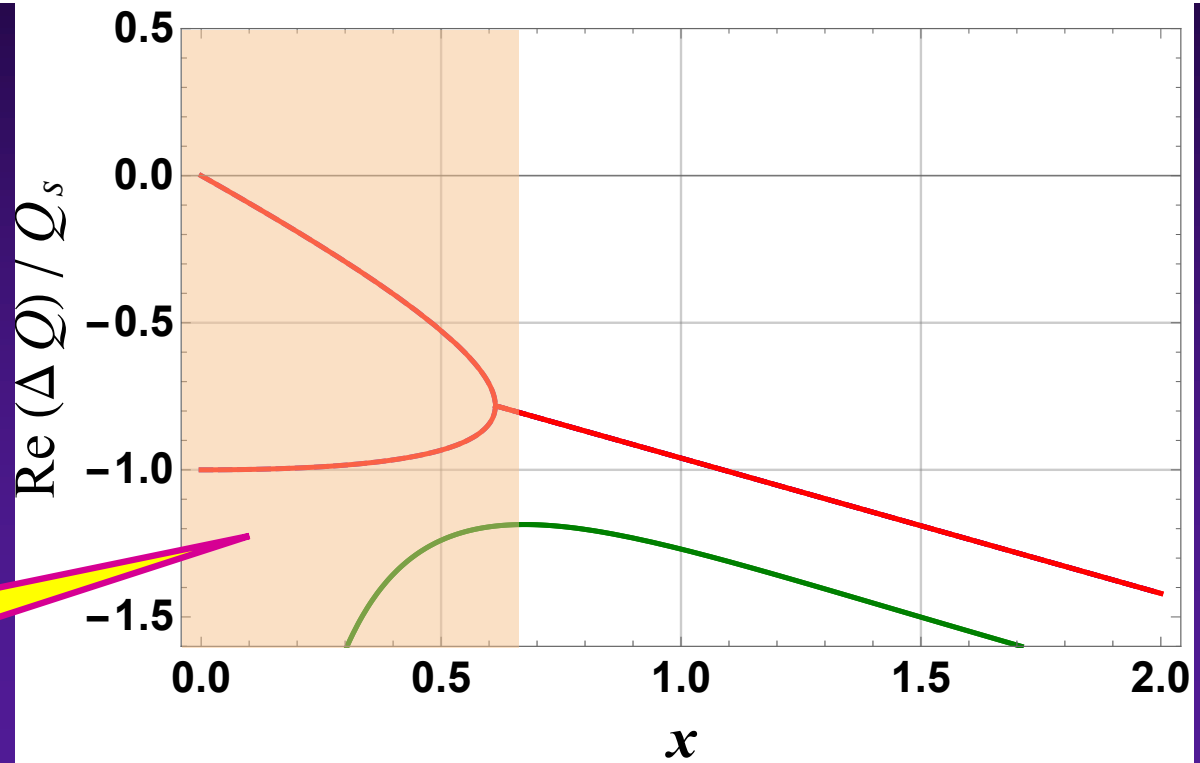
◆ $\Delta q = 1.0$

Parts to be removed...



◆ $\Delta q = 1.2$

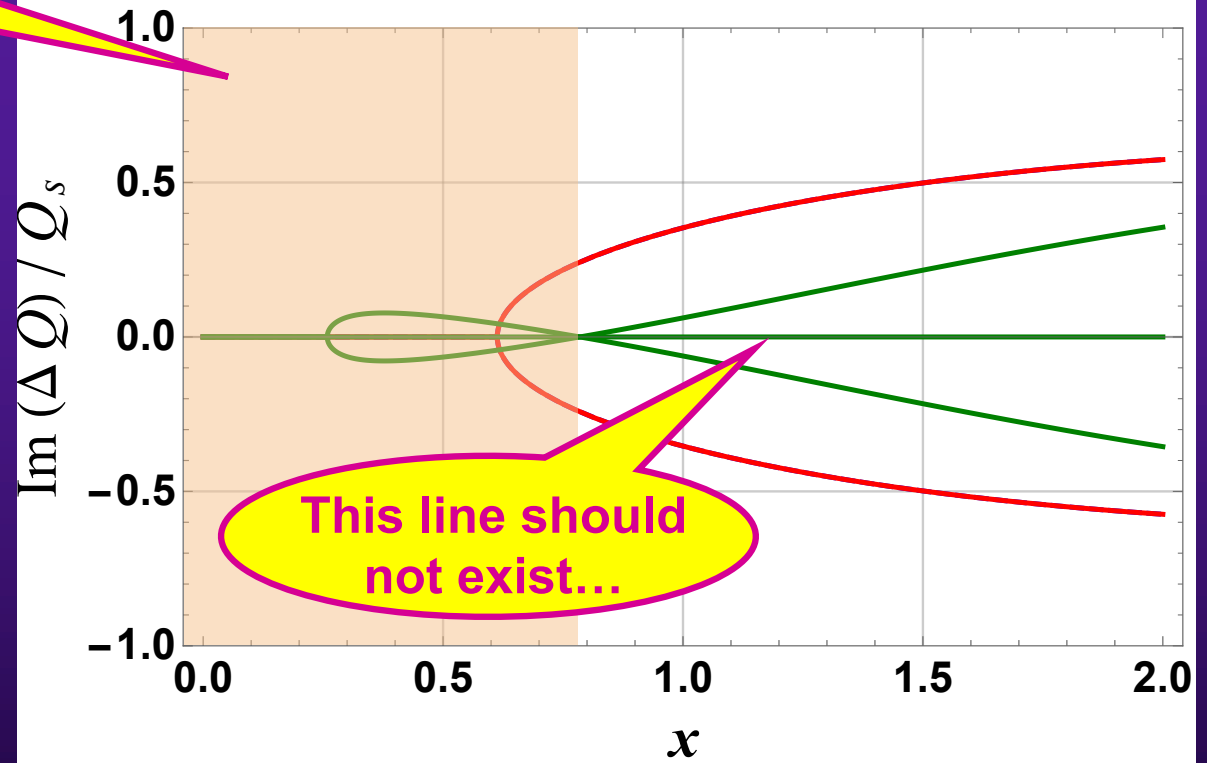
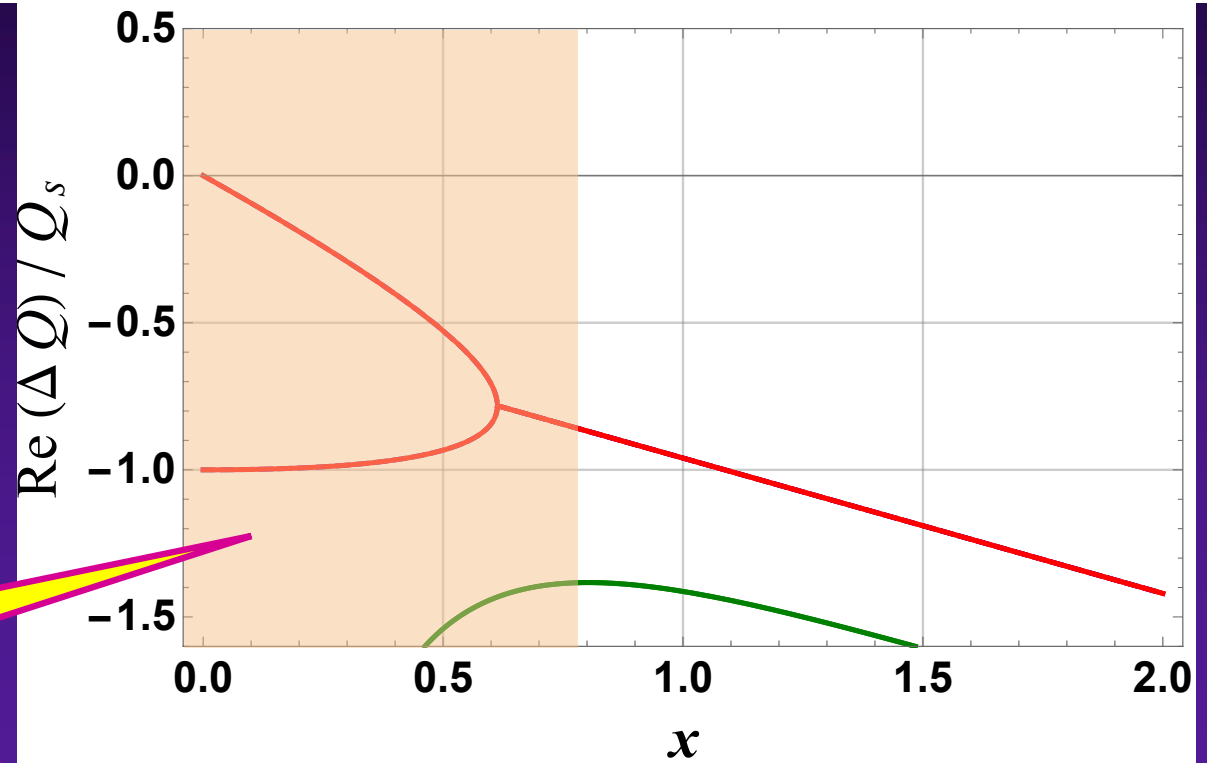
Parts to be removed...



This line should not exist...

◆ $\Delta q = 1.4$

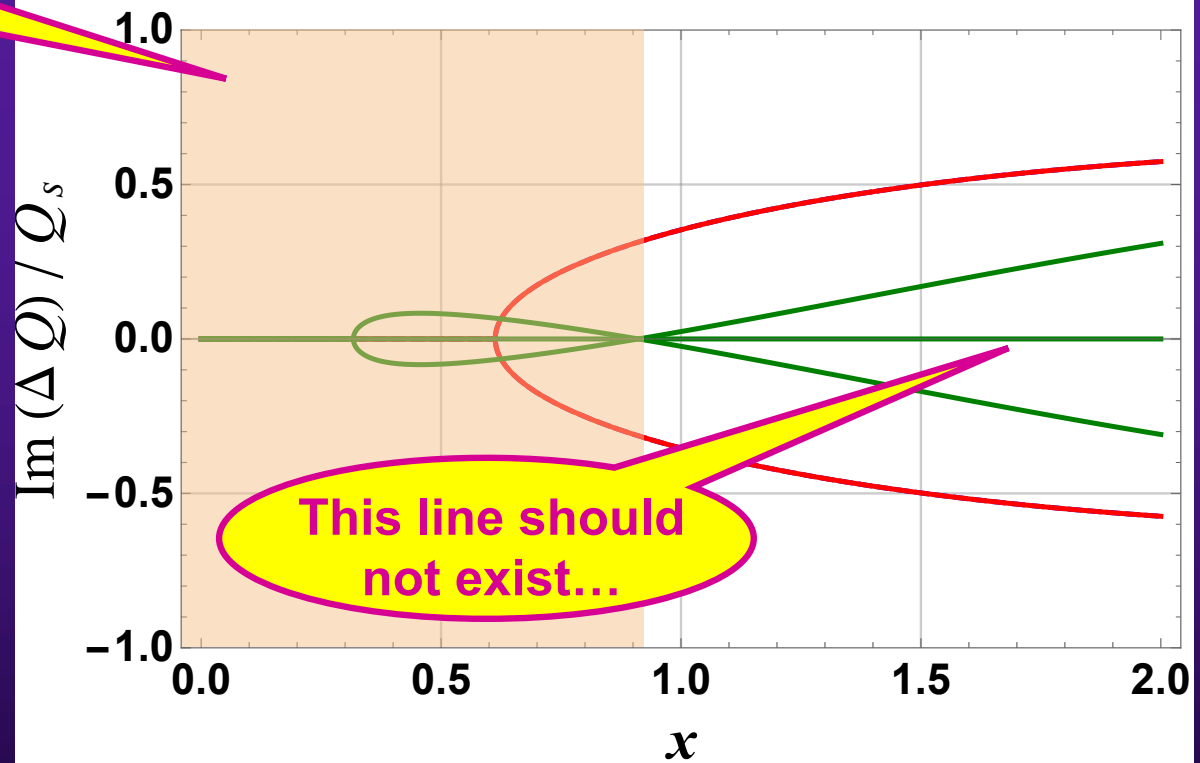
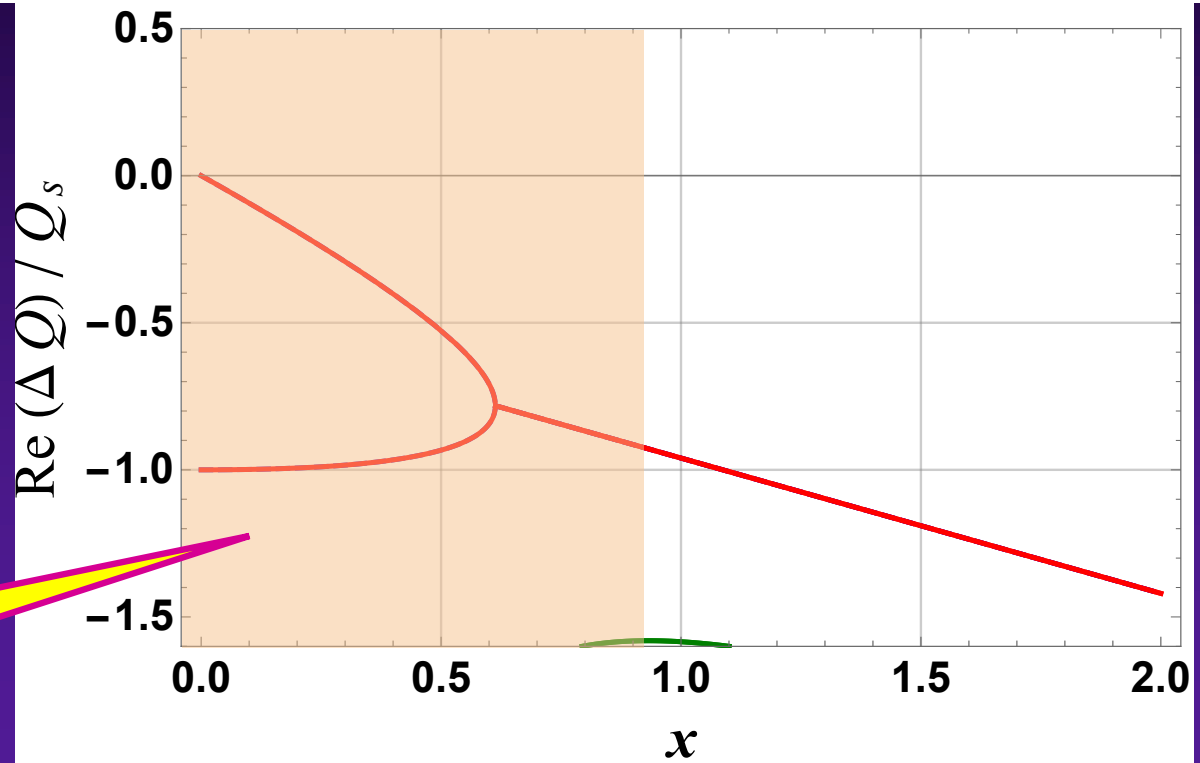
Parts to be removed...



This line should not exist...

◆ $\Delta q = 1.6$

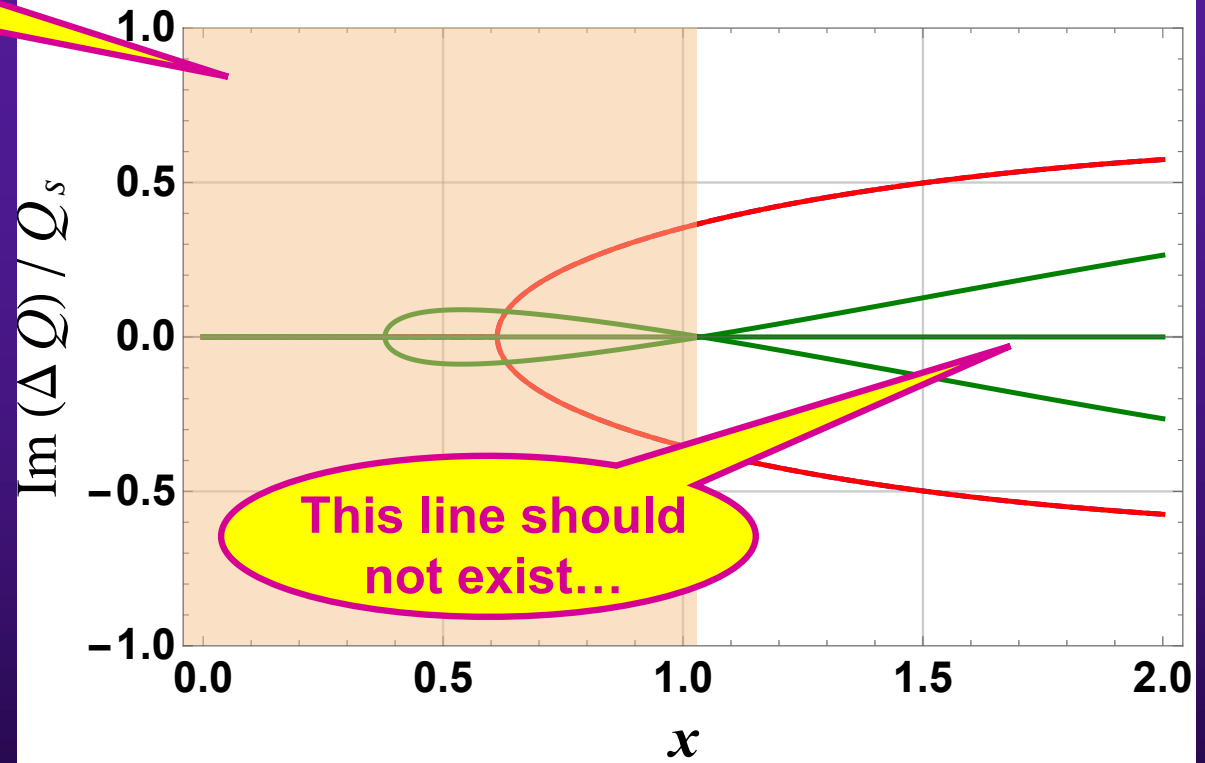
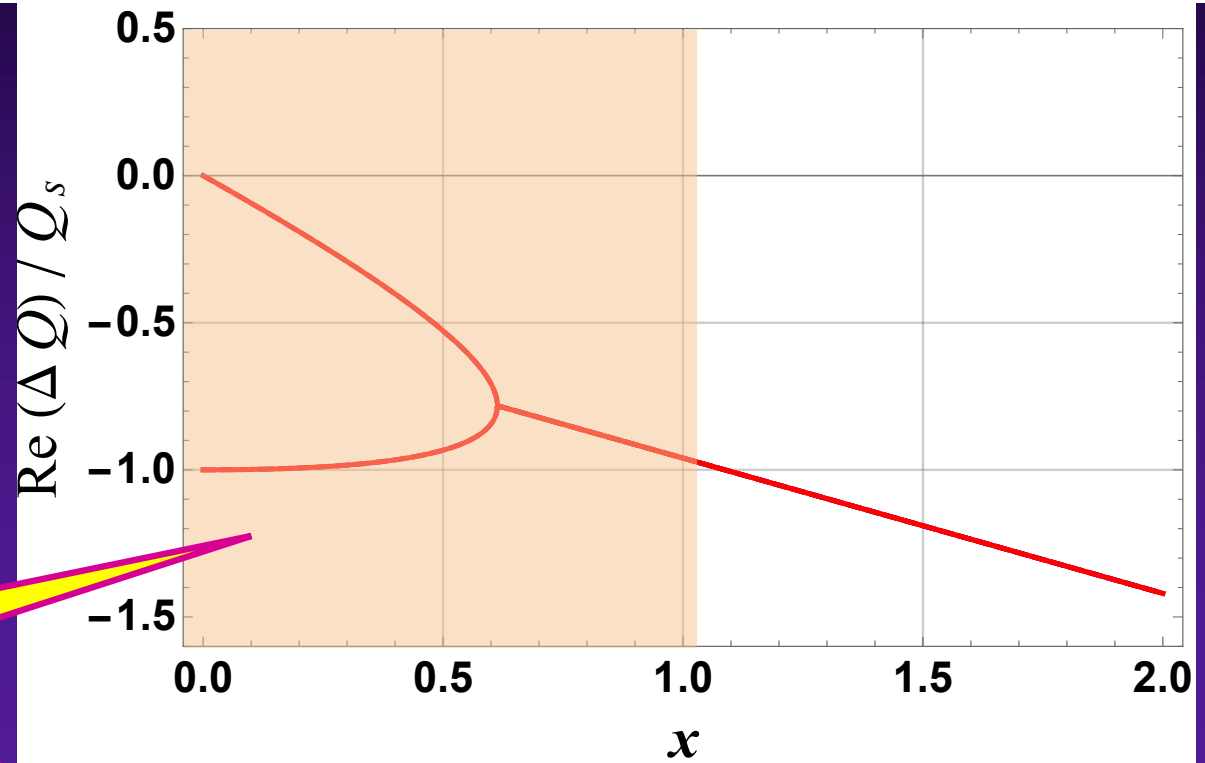
Parts to be removed...



This line should not exist...

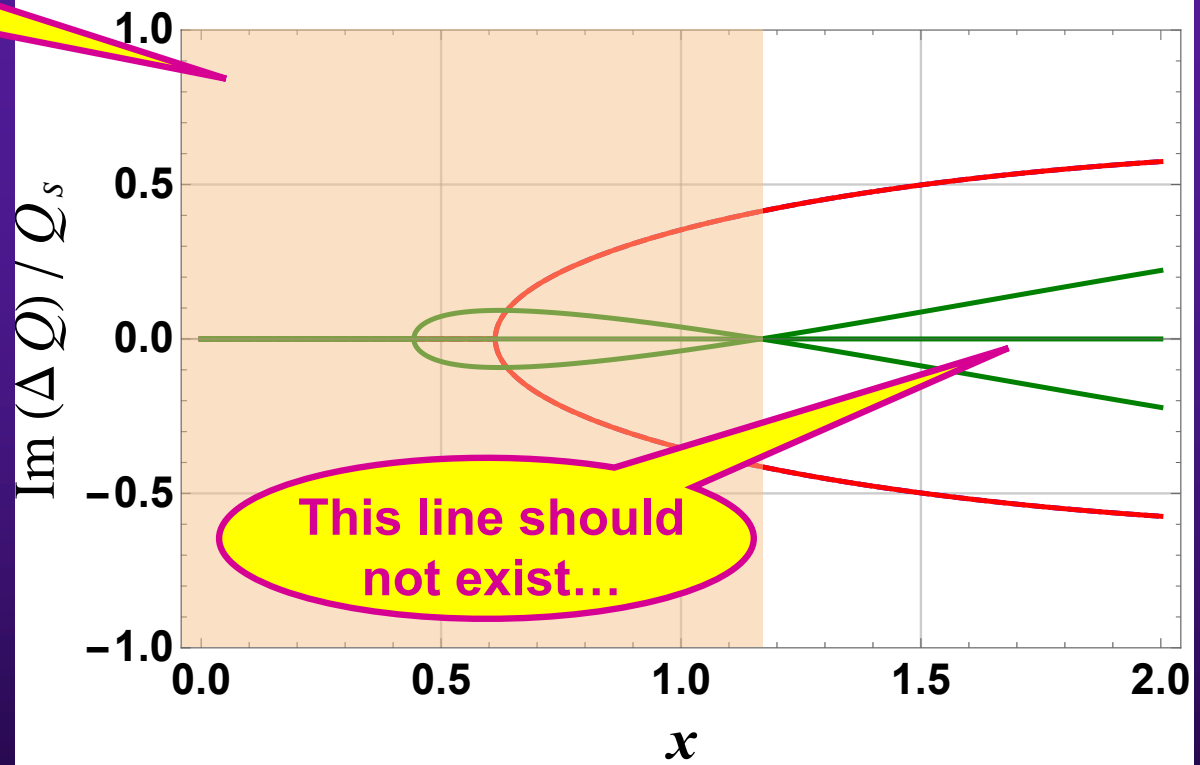
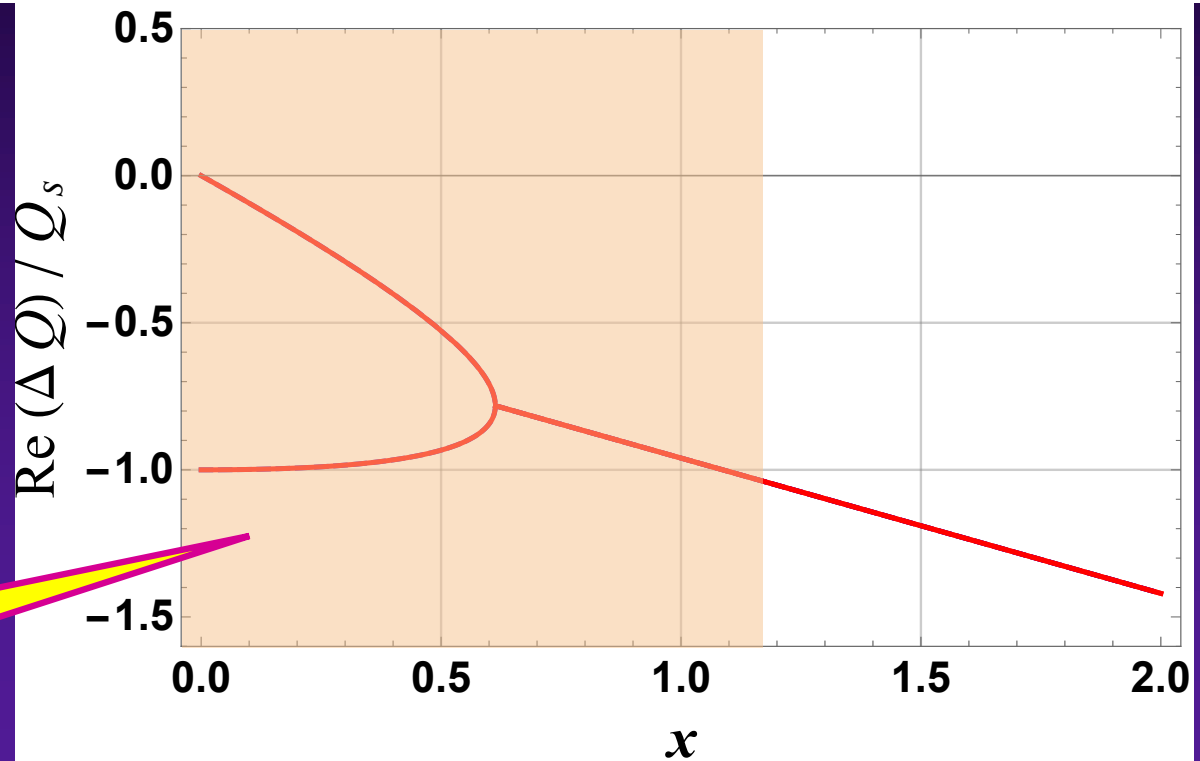
◆ $\Delta q = 1.8$

Parts to be removed...



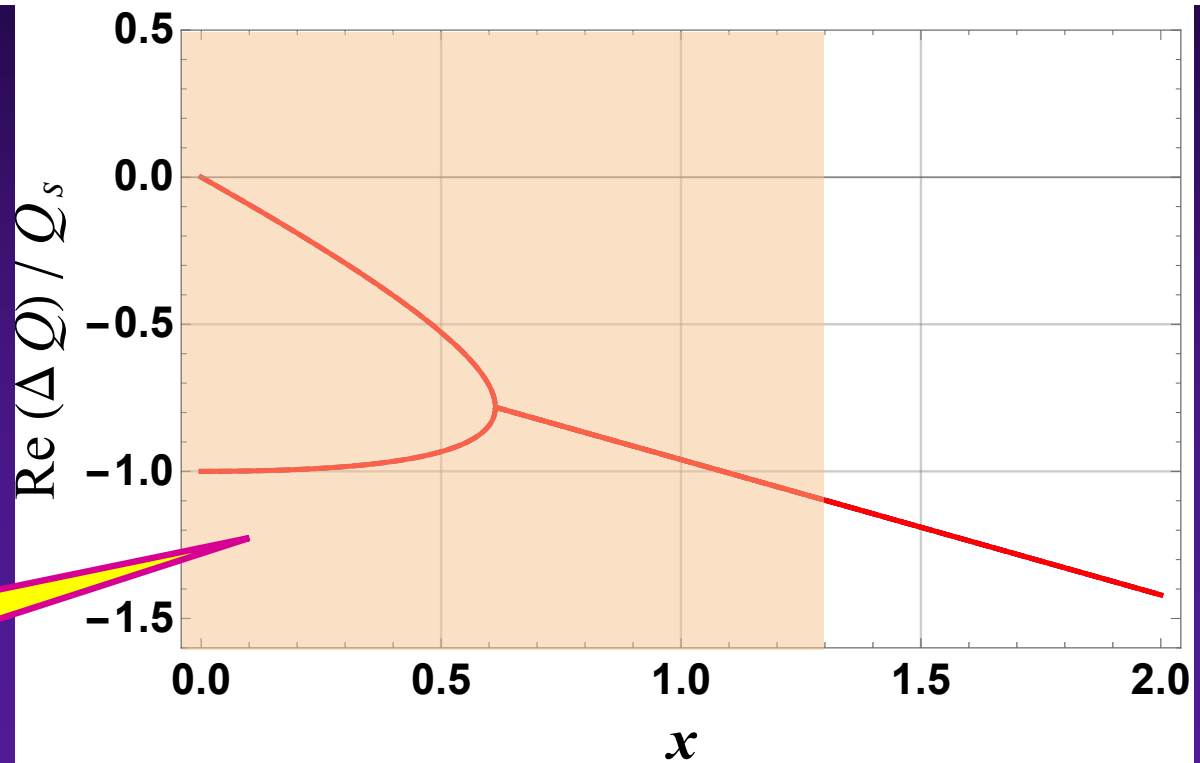
◆ $\Delta q = 2.0$

Parts to be removed...



◆ $\Delta q = 2.2$

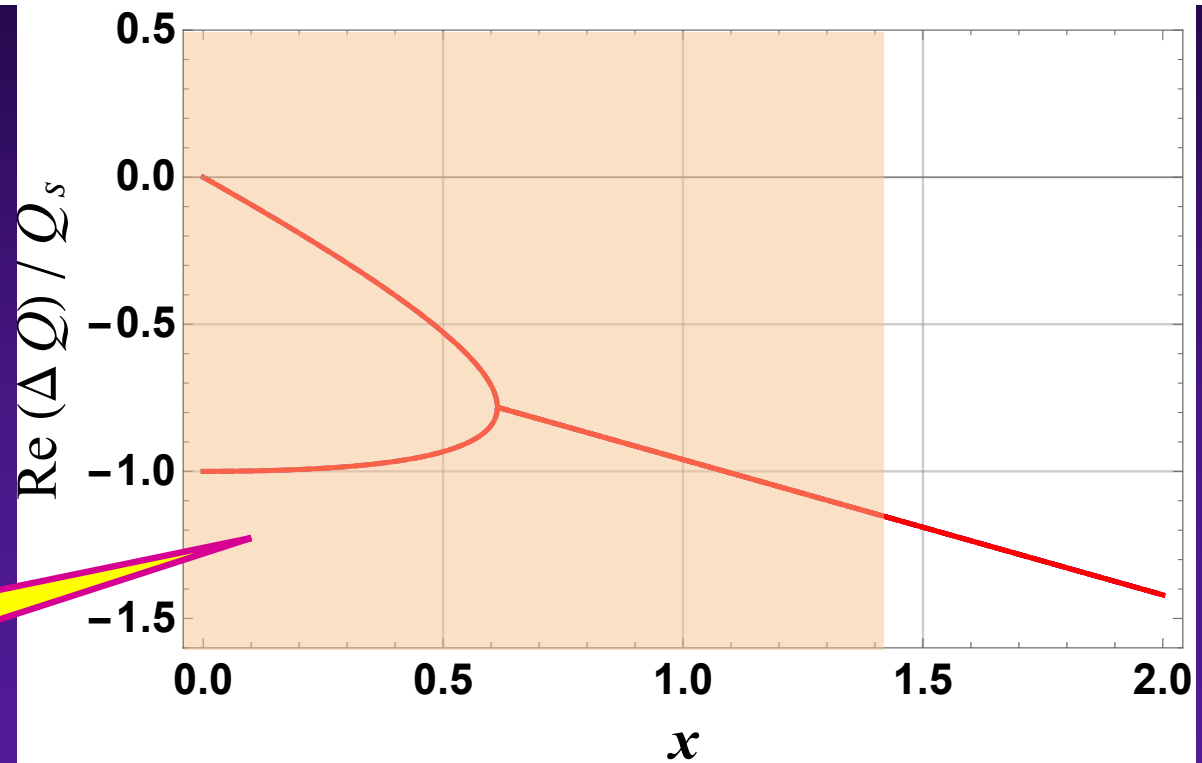
Parts to be removed...



This line should not exist...

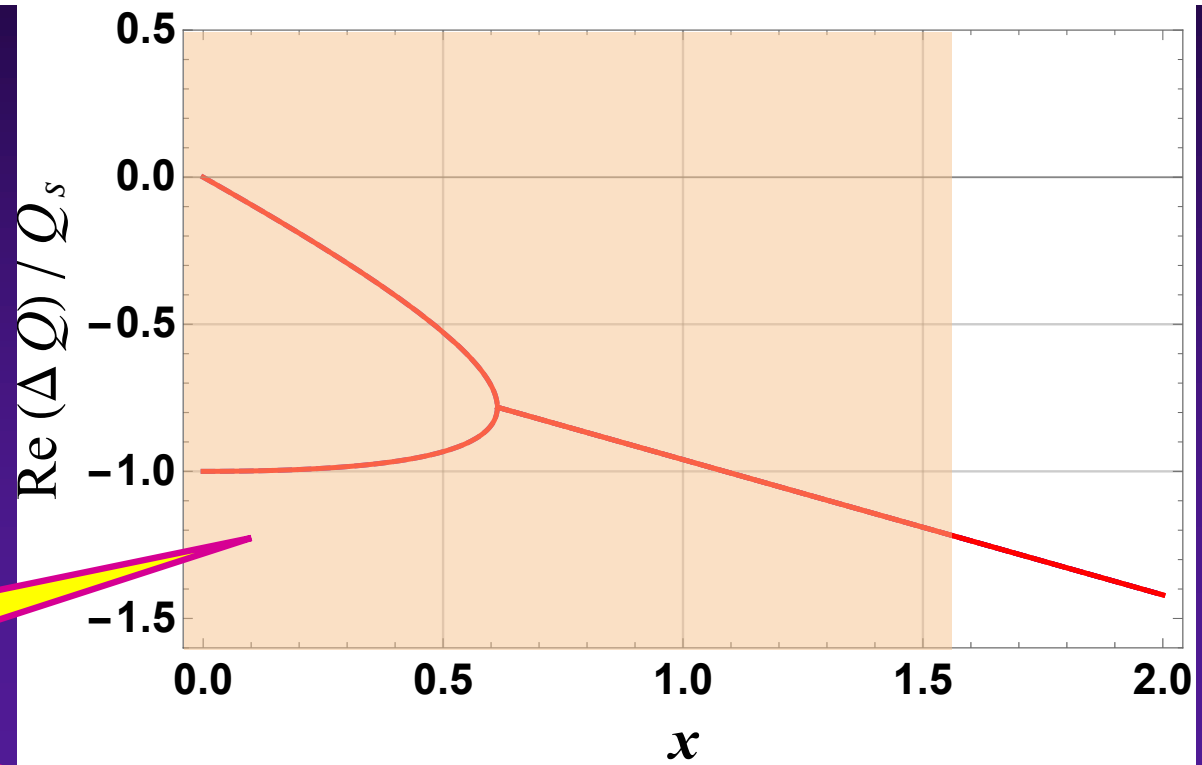
◆ $\Delta q = 2.4$

Parts to be removed...



◆ $\Delta q = 2.6$

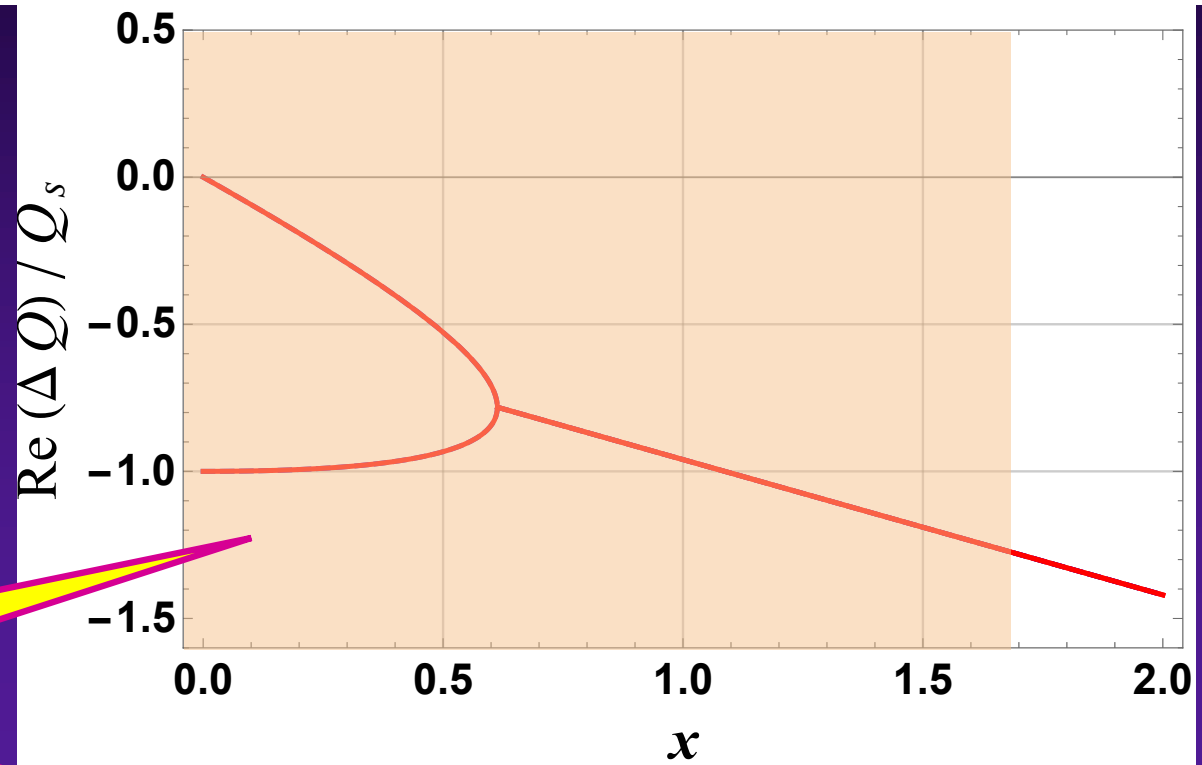
Parts to be removed...



This line should not exist...

◆ $\Delta q = 2.8$

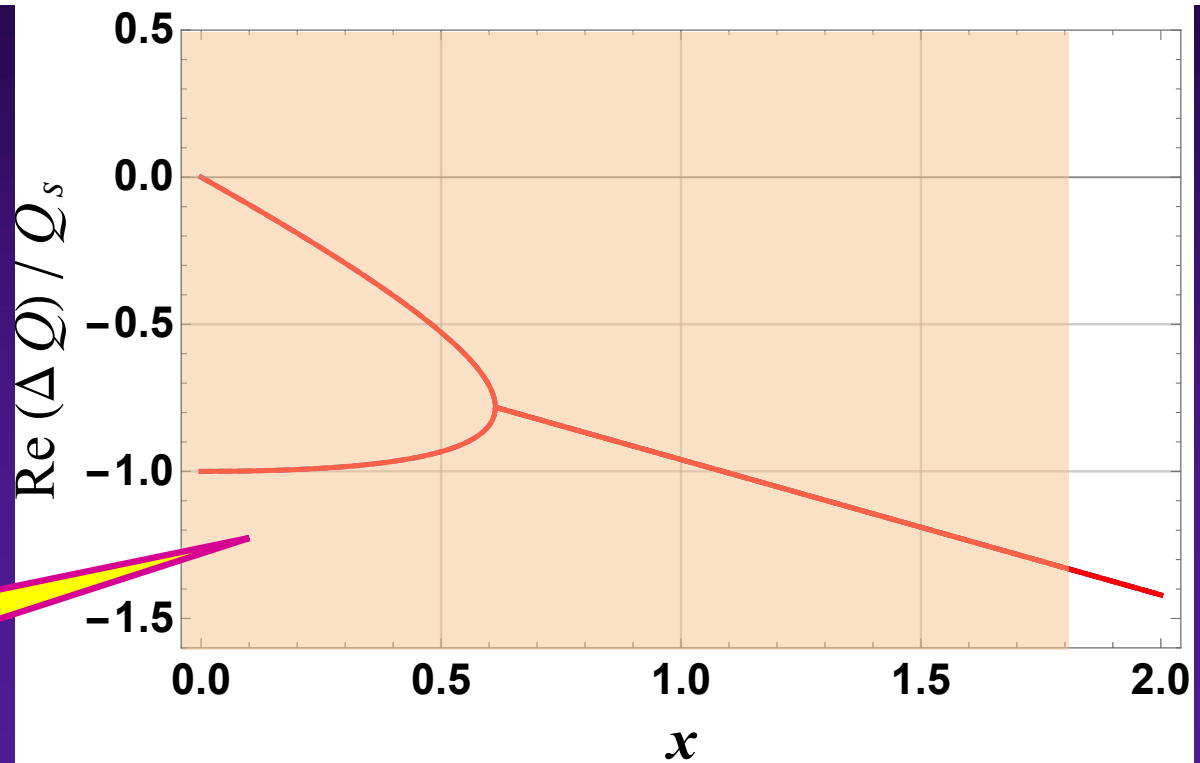
Parts to be removed...



This line should not exist...

◆ $\Delta q = 3.0$

Parts to be removed...



This line should not exist...