Example 7.32. A LTI system has the system function

$$H(s) = \frac{1}{(s+1)(s+2)}.$$

Given that the system is BIBO stable, determine the ROC of H.

Solution. Clearly, the system function H is rational with poles at -1 and -2. Therefore, only three possibilities exist for the ROC:

   i) $\mathrm{Re}(s) < -2$,
   ii) $-2 < \mathrm{Re}(s) < -1$, and
   iii) $\mathrm{Re}(s) > -1$.

In order for the system to be stable, however, the ROC of H must include the entire imaginary axis. Therefore, the ROC must be $\mathrm{Re}(s) > -1$. This ROC is illustrated in Figure 7.20.
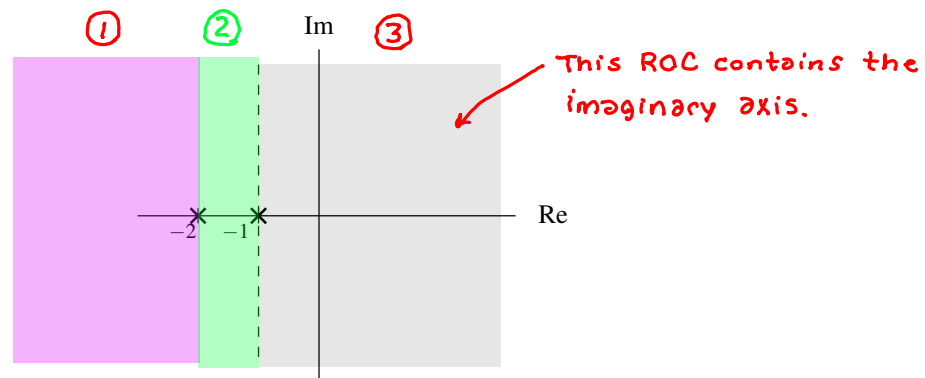

Figure 7.20: ROC for example.

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