Unstable Zeros/Poles?

So far, we've only looked at transfer functions with stable poles and zeros (except perhaps at the origin). What about RHP?

Example: consider two transfer functions,

$$G_1(s) = \frac{s+1}{s+5} \qquad \text{and} \qquad G_2(s) = \frac{s-1}{s+5}$$

Note:

- G_1 has stable poles and zeros; G_2 has a RHP zero.
- Magnitude plots of G_1 and G_2 are the same —

$$|G_1(j\omega)| = \left|\frac{j\omega + 1}{j\omega + 5}\right| = \sqrt{\frac{\omega^2 + 1}{\omega^2 + 5}}$$

$$|G_2(j\omega)| = \left|\frac{j\omega - 1}{j\omega + 5}\right| = \sqrt{\frac{\omega^2 + 1}{\omega^2 + 5}}$$

- All the difference is in the phase plots!