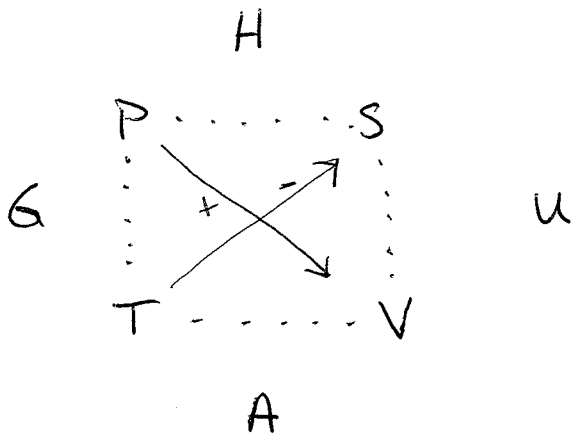
Extra

"The Magic Square"

Think PoSiTiVe



Follow arrows:

$$\left(\frac{\partial G}{\partial P}\right)_T = V \qquad \left(\frac{\partial G}{\partial T}\right)_P = -S$$

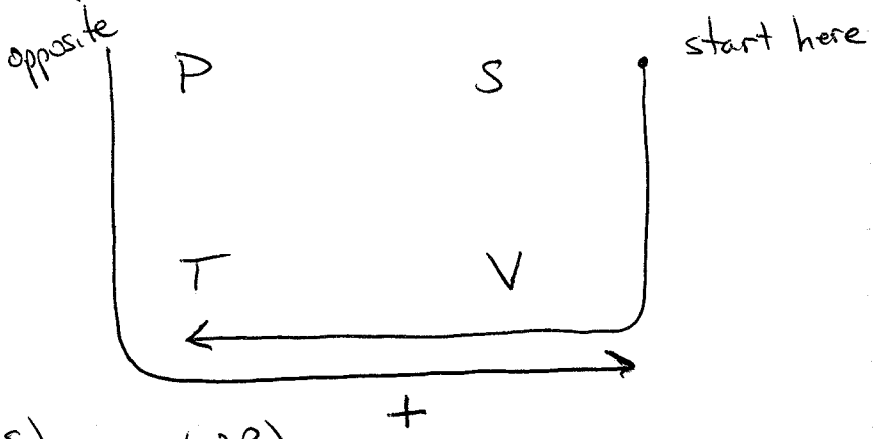
downhill: (+)
uphill: (-)

$$\left(\frac{\partial A}{\partial V}\right)_T = -P \qquad \left(\frac{\partial A}{\partial T}\right)_V = -S$$

etc.

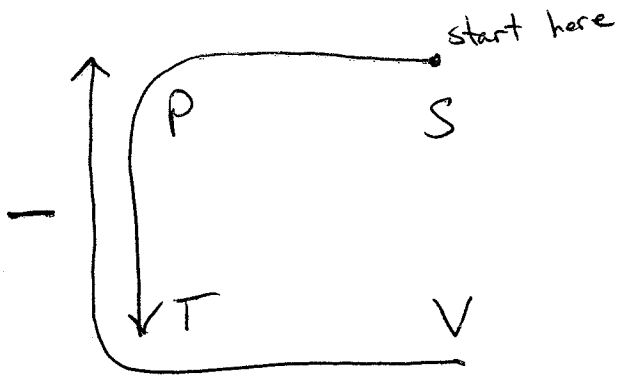
Even better, Maxwell relations:

$\left(\frac{\partial S}{\partial V}\right)_T$



$$\left(\frac{\partial S}{\partial V}\right)_T = \left(\frac{\partial P}{\partial T}\right)_V$$

$\left(\frac{\partial S}{\partial P}\right)_T$



$$\left(\frac{\partial S}{\partial P}\right)_T = -\left(\frac{\partial V}{\partial T}\right)_P$$

cross on top/bottom (+)

cross on sides (−)