3.24 Guggenheim scheme

For reversible processes according to the definitions and following the rules of the Legendre transformation (and ignoring the dependence on N)
we found

$$\begin{aligned} dU &= TdS - pdV \quad \text{or} \quad dS = \frac{1}{T}dU + \frac{p}{T}dV \\ dF &= -SdT - pdV \\ dH &= TdS + Vdp \\ dG &= -SdT + Vdp \end{aligned} \tag{3.60}$$

These fundamental equations are illustrated in the Guggenheim scheme in Fig. 3.9:

1. Differential term of U, F, H, and G on left side of the fundamental equations. Direct neighbors are the natural parameter.
2. Differential terms on right side of the fundamental equations and relevant signs; associated are T, S and p, V.

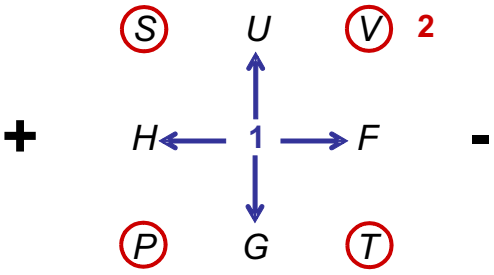

Figure 3.9: Guggenheim scheme to memorize the parameter dependency and signs for thermodynamic potentials.