

### An improved mnemonic device for thermodynamic relations

김영훈<sup>†</sup>  
광운대학교 화학공학과  
(korea1@kw.ac.kr<sup>†</sup>)

Various relations, such as Legendre transforms, Maxwell equations, equations to compute variables, and differential equations for variables, are found in thermodynamics. Even though the time that would be required to learn this mnemonic device would be better spent studying the actual logic that underlies the thermodynamic relations, many have trouble remembering these relations between four state variables (temperature, T; pressure, P; volume, V; entropy, S) and the four thermodynamic potentials (internal energy, U; Helmholtz energy, A; enthalpy, H; Gibbs energy, G). Thus, herein, an improved mnemonic device for thermodynamic relations between state variables and potentials was proposed in the form of a thermodynamic circle. Based on separating the Born square into an inner square (T, P, V, and S) and an outer circle (G, A, U, and H), relations such as Legendre transforms, Maxwell equations, equations to compute variables, and differential equations for thermodynamic variables can be easily recalled.