NAME :

Quiz 6

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(a) Find the three equations of state in the *entropy* representation for a system with the fundamental equation [5]

$$u = \left(\frac{s}{s_0}\right)^2 e^{-v^2/v_0^2}. \tag{1}$$

(b) Consider a system whose internal energy $U \equiv U(S,V,N)$. Using the fact that U is an extensive variable, prove the Euler relation. In other words, show that [5]

$$U(\lambda S, \lambda V, \lambda N) = \lambda U(S,V,N), \qquad \Longrightarrow \qquad U = TS - PV + \mu N. \tag{2}$$

Explain *clearly* what you're doing.