Chemical Thermodynamics
For an isothermal compression of an ideal gas, what is the change in internal energy, $DU$.

- A – positive
- B – negative
- C – 0
Internal energy

- Change in internal energy

- Need to distinguish between exact and inexact differentials
Internal energy

- Internal energy change for reversible expansion of an ideal gas

  Start at
  - $n = 1 \text{ mol}$
  - $T_1 = 300 \text{ K}$
  - $V_1 = 10.0 \text{ L}$
  - $P_1 = 2.5 \text{ bar}$

  - $n = 1 \text{ mol}$
  - $T_2 = 200 \text{ K}$
  - $V_2 = 20.0 \text{ L}$
  - $P_2 = 0.83 \text{ bar}$

- Change along a specified path
Internal energy

- Determine $w$

- To get $q$ need to evaluate $\Delta U$
Exact vs. Inexact

Mathematical definition.
Exact vs. Inexact

- Application to simple case - volume
Internal Energy

- Change in internal energy is a function of temperature and volume.

- \( (dU/dT)_V \)

- \( (dU/dV)_T \)