Identify path functions 2

A differential change of a path function is denoted by:

Assume x is a path function and y is a state function.

- $\delta \rightarrow$ differential (infinitesimal small) change of a path function $\rightarrow \delta x$ (non exact differential)
- $d \rightarrow$ total differential change of a state function $\rightarrow dy$ (exact or total differential)
- $\partial \rightarrow$ partial differential change $\rightarrow \partial y$ (partial differential)
- $\Delta \rightarrow$ difference between two states $\rightarrow$ (difference)
- How is this used? Assume integration between two states 1 and 2:
  - Path function $\rightarrow \int_1^2 \delta x = x$, no difference but only one value for the integration path, $\int_1^2 \delta w = w$ or $\int_1^2 \delta q = q$. This is important to realize: In a process there is no difference in w or q. The w or q is connected to the process not to the state and therefore there cannot be a difference in q or w, but there is only a certain amount q or w that is connected to a certain path. A different path can have a different amount of q or w.
  - State function $\rightarrow \int_1^2 dy = y_2 - y_1 = \Delta y$, between to states there can be a difference in the value of the properties, e.g. if the pressure change the pressure difference is $P_2 - P_1 = \Delta P$.

In short:

- δx, dy, δy are infinitesimal small changes that need to be integrated.
- Δy is a finite change after integration (only for a state function).