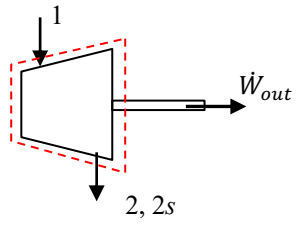


## **ME 200 (Thermodynamics I)**

**Device isentropic efficiencies**

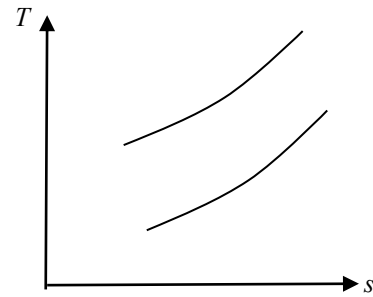
## Isentropic Efficiency for a Turbine



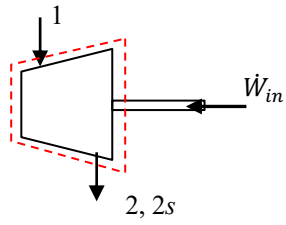
Define a turbine's isentropic efficiency as,

$$\eta_{turbine,isen} \equiv \frac{\dot{W}_{by\ CV,actual}}{\dot{W}_{by\ CV,isentropic}}$$

Typical values:  $\sim 0.7 - 0.9$ .



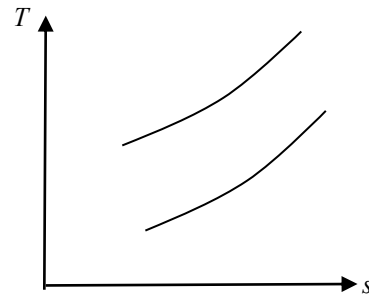
## Isentropic Efficiency for a Compressor/Pump



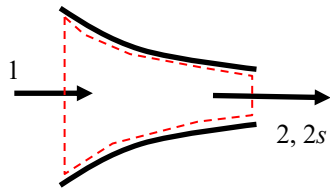
Define a compressor (or pump) isentropic efficiency as,

$$\eta_{compressor/pump,isen} \equiv \frac{\dot{W}_{into CV, isentropic}}{\dot{W}_{into CV, actual}}$$

Typical values:  $\sim 0.75 - 0.85$ .



## Isentropic Efficiency for a Nozzle



Define a nozzle isentropic efficiency as,

$$\eta_{nozzle,isen} \equiv \frac{\frac{1}{2} V_{2,actual}^2}{\frac{1}{2} V_{2,isentropic}^2}$$

Typical values:  $\sim 0.95$ .

