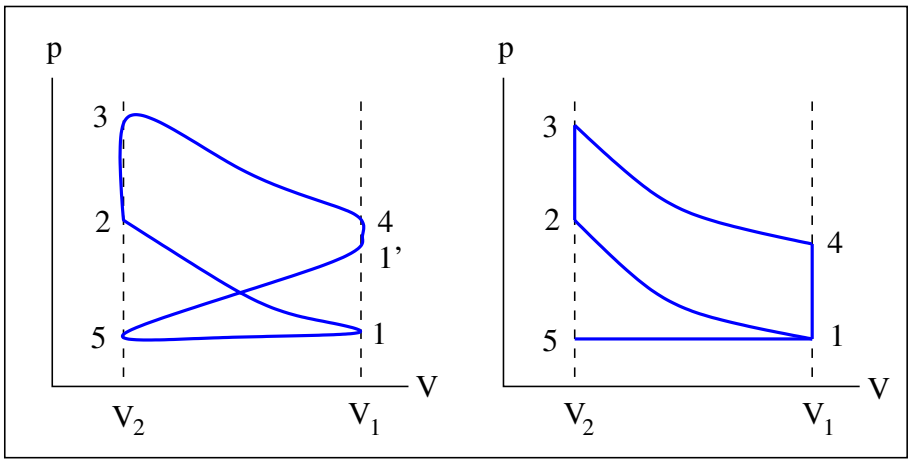
Gasoline engine (Otto cycle) [tln65]



Four-stroke Otto cycle (left)

1-2: compression stroke

2-3-4: power stroke (spark plug ignites at 2)

4-1'-5: exhaust stroke (exhaust valve opens at 4)

5-1: intake stroke (intake valve opens at 5)

Idealized Otto cycle (right)

1-2: adiabatic compression of air-fuel mixture ($S = \text{const}$)

2-3: explosion of air-fuel mixture ($V = \text{const}$)

3-4: adiabatic expansion of exhaust gas ($S = \text{const}$)

4-1: isochoric release of exhaust gas ($V = \text{const}$).

1-5-1: intake stroke (thermodynamically ignored)

Parameter: $K \doteq V_1/V_2$ (compression ratio).

The compression ratio K must not be chosen too large to prevent the air-fuel mixture from igniting spontaneously, i.e. prematurely.