

UOFSC, DEPARTMENT OF PHYSICS & ASTRONOMY.

Graduate student problem competition

Nov 13–Nov 19, 2023

All graduate students are eligible to participate.

To submit your solution, e-mail it to bazaliy@mailbox.sc.edu

Efficiency of a cycle

A thermodynamic engine works with ideal, monoatomic gas. The gas is driven around a “circular” cycle on the (P, V) plane that is given by an equation

$$\left(\frac{P - P_0}{P_0/2}\right)^2 + \left(\frac{V - V_0}{V_0/2}\right)^2 = 1$$

with known parameters P_0 and V_0 . Find the efficiency of this cycle and compare it with the efficiency of a Carnot cycle that has the same high and low temperatures.