[tex39] **Rubber band heat engine**

Consider a heat engine that uses a rubber band in the three-step cycle shown. The equation of state $J = \alpha LT$ with $\alpha =$ const relates the tension J in the band to the length L of the band and to the absolute temperature T. The heat capacity of the band at constant length is $C_L =$ const.

Calculate the heat transfer ΔQ and the work performance ΔW in each of the three steps, and from these results calculate the efficiency η of the rubber band heat engine. Compare η with the efficiency of a Carnot engine operating between the same temperatures.