Since I profited very much from a general link between pressure and irreversibility of an adiabatic process.

I wonder about how one defines mathematically that a process is reversible for a process that has both pressure and temperature differences from definition of total entropy while expressing this reversibility with only temperature and pressure as variables:

Is there a mathematical way to show how much a factor the temperature is and how much a factor the pressure is and then find an equilibrium where the process is reversible for a state that has both pressure and temperature differences? That is finding a way to express while only using p, T, V and as variables while there are pressure and temperature differences and showing where the values of T and p are that creates ? Maybe doing this with the same variables as in the explanation for an irreversible adiabatic process below?

Here is a way I found to show that in general an irreversible adiabatic process must have positive entropy if as an illustration for what kind of explanation I really would like since it explains the irreversibility by relating it only to pressure and I wondered about an explanation for my problem by using any combination of the three variables p, V and T. Help is much appreciated on this problem!

My explanation why irreversible adiabatic expansion has

Expansion:

For reversible adiabatic expansion we can prove that like this:

Entropy from volume change isothermal reversible:

Change in temperature at constant volume:

For reversible adiabatic process we must have that:

Because we must have:

That is







 For same volume expansion we have that