Entropy is Constant & Arrow of Time is T-Symmetric

Sandeep Shital Prasad Jaiswal
Master of Science from University of Alabama in Huntsville
2/92 Liberty, Garodianagar, Ghatkopar (East), Mumbai 400077.

Ethics approval
There are no human participants in the study and all procedures in studies were in accordance with the ethical standards of the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Consent to publish
No consented is required for the submission of the case report to the journal as no patients/human beings were involved in the study.

Abstract
This paper show that the second law of thermodynamics is incorrect and that the entropy stays always constant and is not always increasing, as originally stated in physics. This paper also has a solution for the arrow of time dilemma in physics.

Second Law of Thermodynamics is False
The second law of thermodynamics states that the entropy of an isolated system always increases or remains constant for a reversible system. It also states that the entropy of the universe is always increasing and that the entropy change is always positive i.e.

$$\Delta S total = \Delta S surroundings + \Delta S system > 0$$

If we consider earth as a system that gets heated at a point during the day to the maximum temperature T_H with Q_H as the net heat added (by the sun, primarily and other bodies on earth with some heat radiated & some reflected). The change in entropy during the day is given by the formula:

$$\Delta Sd, earth = \frac{Q_H}{T_H}$$

During the night time the temperature decreases to minimum T_c with Q_c being the amount of heat absorbed (radiated, primarily as there is no heating source from the sun) and the temperature decreases. The change in entropy at the night is given by the formula:

$$\Delta Sn, earth = -\frac{Q_c}{T_c}$$

For a given season on earth, the temperature next day more or less stays constant and will again increase to T_H during the day and T_c during the night. We also know that the heat transferred depends on the mass and specific heat of the substance given by the formula, $Q = mc\Delta T$. As the change in temperature ΔT is the same from one day to the next and there is no change in mass and specific heat of earth, the change in entropy, which is given by the above two formula's remains constant with the same amount of net heat Q_H and $-Q_c$ absorbed and radiated, daily.

Therefore, the entropy of the earth for a period of a day remains constant for a season and for the season, remains constant for the year:

$$(\Delta Sd, earth + \Delta Sn, earth)D = (\Delta Sd, earth + \Delta Sn, earth)D+n$$

Where n = next day for a season or same day next year

Or, $\frac{QH}{TH} - \frac{Qc}{Tc} = $ Constant

$\Delta Searth = 0$

This means that there is no change in entropy of the earth with the passage of each day and it behaves like a perfectly reversible system, although it is actually an irreversible open system.This assumes that the temperature of the earth is the same every year irrespective of the effect of greenhouse gases. The entropy of the earth will increase every year if we take pollution into effect but this still holds good as the temperature is fairly constant.

This derivation can well be extended across the solar system to all the other planets and to the entire universe in general.

Or in other words, $\Delta Suniverse = 0$

This means that the entropy remains always constant and is not always increasing as stated in the second law of thermodynamics for an irreversible open system.

$$\Delta Stotal = \Delta Ssurroundings + \Delta Ssystem = 0$$

Arrow of Time
A constant entropy means that the universe was always ordered and randomness stays constant. Entropy is hence not the right variable to define the arrow of time. There is an arrow of time because this is a property of time to move in the forward direction. Time cannot travel backwards and can exist only in the present moment of time as time can also not move the present moment into the future. This is a law of nature and should be one of the laws of physics as an arrow of time. Once we have it as one of the laws then it becomes T-symmetric too as it is valid in the past, the present and the future.

Conclusion
The paper thus proves that entropy of this universe is constant and is not always increasing as stated in the second law of thermodynamics. Further, if we have a new law of physics for the function of time then the arrow of time dilemma can also be solved and it becomes T-symmetric like other laws.

Conflict of Interest: The authors declare that they have no conflict of interest

References
[1]. Wikipedia, https://en.wikipedia.org/wiki/Entropy
[2]. BYJU's, https://byjus.com/jee/entropy/