

- [Published: 31 October 2018](#)

Component-wise exergy analysis using adaptive neuro-fuzzy inference system in vapor compression refrigeration system

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Journal of Thermal Analysis and Calorimetry **volume 136**, pages 2111–2123 (2019) [Cite this article](#)

Abstract

In this work, the adaptive neuro-fuzzy inference (ANFIS) system as an artificial intelligence method was used to predict the destruction of exergy in components (compressor, condenser, capillary tube and evaporator) of a vapor compression refrigeration system using a mixture of R134a and LPG refrigerant (consisting of R134a and LPG in a ratio of 28:72 by mass fraction). For this purpose, ANFIS models were developed to predict the destruction of exergy in each component using some experimental data recently published in author previous publication, and the remaining data were used to validate the developed models. It was found that the predictions of ANFIS models are in good agreement with the experimental results and give an absolute fraction of variance in range of 0.996–0.999, a root mean square error in range of 0.0296–0.1726 W and mean absolute percentage error in range of 0.108–0.176%, respectively. The results suggest that the ANFIS models can predict the destruction of exergy in the components of refrigeration system quickly and with high accuracy.

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Acknowledgements

The authors would like to acknowledge the IKG PTU, Kapurthala and BCET Gurdaspur for their excellent support.

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Ethics declarations

Conflict of interest

The authors declare that they have no conflict of interest.

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Gill, J., Singh, J., Ohunakin, O.S. *et al.* Component-wise exergy analysis using adaptive neuro-fuzzy inference system in vapor compression refrigeration system. *J Therm Anal Calorim* **136**, 2111–2123 (2019).

<https://doi.org/10.1007/s10973-018-7857-8>

[Download citation](#)

- Received 20 March 2018
- Accepted 20 October 2018
- Published 31 October 2018
- Issue Date 15 June 2019
- DOI <https://doi.org/10.1007/s10973-018-7857-8>

Keywords

- **R134a/LPG**
- **Exergy destruction**
- **Compressor**
- **Condenser**
- **Evaporator and capillary tube**
- **ANFIS**

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