



## Selection of the best coefficient of performance prediction by artificial neural network model considering uncertainty

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### ABSTRACT

Four artificial neural networks (ANNs) with several configurations predicted the coefficient of performance (COP) of absorption heat transformer with duplex components. In this work, uncertainty analysis is applied to these ANNs models using Monte Carlo method with the aim to select the most appropriate ANN model in the sense that its structure when uncertainty was added, it gives a prediction of the COP close to the experimental value of the same. Experimental conditions of absorption heat transformer with duplex components are used considering the COP ranged from 0.12 to 0.33. According to our numerical results the ANN model that considers three temperatures in the absorption cycle ( $T_{inGE-AB}$ ,  $T_{inAB-GE}$  and  $T_{outGE-AB}$ ) and one pressure level ( $P_{AB}$ ) in the input layer and four neurons in the hidden layer to predict COP was the most accurate. For this ANN model, normal probabilistic distribution of the COP is observed and the mean of the probabilistic distribution is close to the experimental COP.

*Keywords:* Standard deviation; Monte Carlo method; Water purification system; Heat transformer

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