Chitchai Jarunratanakul 2009: Prediction of Compressor Performance Map by using Neural Network and Beta Line. Master of Engineering (Aerospace Engineering), Major Field: Aerospace Engineering, Department of Aerospace Engineering. Thesis Advisor: Assistant Professor Anurak Atthasit, Ph.D. 81 pages.

The predictions of compressor properties are necessary such as unknown mass flow rate and pressure ratio relation. These predictions are important to evaluate the efficiency of gas turbine, thus the compressor function in each round speeds are unable to interpolate. The non-linear problem is a principal cause. On the top of that, it is non-function curve which its curve gives more than one output for one input. In compressor map, this problem is always founded in highest mass flow rate of each round speeds. In effect, there are varies of pressure ratio values by only one mass flow rate value.

The Artificial Neural-network in type back-propagation (BP) of Levenberg-Maquardt was studied in this research to predict compressor performance characteristics. In particular, neural network in type BP is capable to reproduce possible outputs for new inputs for unknown relation functions. The non-linear data is also capable to reproduce. However, Neural-network in type BP is insufficient in case of non-function data. Thus, Beta-line is represented in this research to remove non-function problem for Neural-network. The objective of this study is to investigate the prediction method for non-linear and non-function data.

The Combination of Neural-network with Beta-line is studied to enhance accuracy of compressor maps prediction. This research's objective is to define a Neural –network model which enable with a variety of compressor maps. Moreover, Beta-line is helping to enhance the corrective trend prediction of Neural-network which supports to similarity of prediction's curve and smoother curve for compressor maps.

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