# Forum Acusticum Euronoise 2025

23-26 June 2025

**Place:**

Málaga, Spain

**Title:**

Estimation of interpretable non-linear Sound Quality Metrics using Kolmogorov-Arnold Networks (KANs)

**Authors:**

Thiago Lobato; Fabian Kamp

**Abstract:**

Sound Quality Metrics are widely used to evaluate the sounds of machines, environments, and essentially anything audible to people. Typically, combinations of (psycho-) acoustic parameters are used to establish such metrics by mapping the perceptive evaluation of sound and quantifying the perceived sound quality. These metrics can replace costly jury testing activities, which only need to be conducted once to determine the metrics themselves. To employ them in product optimization tasks, engineers and designers must understand which properties of a sound must be modified to improve the metric results and hence, the perceived sound quality of the product. Thus, the metrics need to be interpretable, which may limit their accuracy and expressive power. Recently, Kolmogorov–Arnold Networks (KANs) were introduced, which can estimate analytical expressions of complex learned relationships, thereby providing an effective way to learn non-linear metrics with a differential formulation. This stands in contrast to classical symbolic regression methods, which must be learned, at least partially, in a discrete manner. This work investigates how well KANs can be used to learn non-linear relationships for Sound Quality Metrics, and compares the results both to fully interpretable linear equations and established black-box machine learning methods, such as Support Vector Machines and Gaussian Processes.

Find more event abstracts in our >> abstracts archive <<

HEAD acoustics GmbH
Ebertstraße 30a
52134 Herzogenrath, Germany

Thiago Lobato
Mail: info@head-acoustics.com
Telephone: +49 2407 577-0