



Contribution ID: 4

Type: **Wystąpienie ustne // Talk**

Hypercomplex neural networks

Saturday, 6 September 2025 17:00 (10 minutes)

This presentation will cover the foundational principles of deep learning, emphasizing representation learning and inductive biases in real-valued neural networks, before extending to hypercomplex neural network architectures. We present theoretical and experimental results demonstrating the enhanced representational capabilities of hypercomplex networks for complex-valued data and multidimensional signal processing. The theoretical framework encompasses proper activation function design, Wirtinger calculus applications, and its extensions to hypercomplex domains. Various methodological approaches to hypercomplex network architectures are examined. The work provides a comprehensive foundation for understanding and implementing hypercomplex neural networks across different application domains, such as RF spectroscopy.

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Session Classification: InnoFusion 2025: Sesja wystąpień ustnych

Track Classification: Teoria // Theory