



Contribution ID: 122

Type: **talk**

## On multivariate polynomials achievable with quantum signal processing

*Wednesday 22 January 2025 16:00 (15 minutes)*

Quantum signal processing (QSP) is a framework which was proven to unify and simplify a large number of known quantum algorithms, as well as discovering new ones. QSP allows one to transform a signal embedded in a given unitary using polynomials. Characterizing which polynomials can be achieved with QSP protocols is an important part of the power of this technique, and while such a characterization is well-understood in the case of univariate signals, it is unclear which multivariate polynomials can be constructed when the signal is a vector, rather than a scalar. This work uses a slightly different formalism than what is found in the literature, and uses it to find simpler necessary conditions for decomposability, as well as a sufficient condition - the first, to the best of our knowledge, proven for a (generally inhomogeneous) multivariate polynomial in the context of quantum signal processing.

### Email Address of submitter

lorenzo.laneve@usi.ch

### Short summary

**Author:** LANEVE, Lorenzo (Università della Svizzera Italiana)

**Co-author:** Prof. WOLF, Stefan (Università della Svizzera Italiana)

**Presenter:** LANEVE, Lorenzo (Università della Svizzera Italiana)

**Session Classification:** Computing and Algorithms