POEMA

Meeting Type	***Online Learning Weeks***
Date	***08 July 2020***
Time	***16:00 – 17:30 CEST***
Talk	***Symmetries in algorithmic questions in real algebraic geometry***
Lecturer	***Cordian Riener (UiT The Arctic University of Norway)***
No of attendants	***62***

1. Questions during the course

- Is the décomposition unique ?
- In positive characteristic how do you replace the scalar product?
- How does this relate to Artin-Wedderburn?
- But why does this preserve PSD?
- Is there a (maybe simpler) specific formulation for linear programs?
- Can you please remind why you insisted to deal with a SDP with Hermitian complex matrices instead of real ones?
- What changes if the group is infinite? As for example G is the reals. Does the generator of the group induce some decomposition then?
- What groups appear in practice? Did you ever see a Quaternionic group?
- Can you say something about generalisation of g-invariance of an SDP, to the case where the data matrices belong to a matrix *-algebra?
- What groups appear in practice? Did you ever see a Quaternionic group?
- In practice the symmetry adapted basis can look quite complicated. Are there tricks how to calculate the zonal matrices from these more efficiently?
- Following on the question of Etienne: with groups we have G-invariance of SDP; How to detect if we have a decomposition which does not come from a group symmetry?
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Chat history:

- Fabrício Caluza Machado to everyone: a good trivial example is the trivial representation acting on a space not one-dimensional

- Marek Kaluba to everyone: the same formula for inner product works as long as the exponent of group is coprime with the characteristic
- Marek Kaluba to everyone: the intertwining operator T can be chosen to be unitary iirc
- Daniel Brosch to everyone: For linear programs it should work to just choose a basis of the invariant vectors
- Marek Kaluba to everyone: In my case I've seen Sym(n) wreath Sym(m)
- Marek Kaluba to everyone: this is a brand new paper on this: https://arxiv.org/pdf/2007.02459.pdf
- Daniel Brosch to everyone: I have applied it on problems of size 20.000 X 20.000