

First results on the representation theory of the Ultrahyperbolic BMS group $\text{UHB}(2, 2)$

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The Bondi–Metzner–Sachs (BMS) group B is the common asymptotic group of all asymptotically flat (lorentzian) space–times, and is the best candidate for the universal symmetry group of General Relativity (G.R.). B admits generalizations to real space–times of any signature, to complex space–times, and supersymmetric generalizations for any space–time dimension. With this motivation McCarthy constructed the strongly continuous unitary irreducible representations (IRs) of B some time ago, and he identified $B(2, 2)$ as the generalization of B appropriate to the to the ultrahyperbolic signature $(+, +, -, -)$ and asymptotic flatness in null directions. We continue this programme by introducing a new group $\text{UHB}(2, 2)$ in the group theoretical study of ultrahyperbolic G.R. which happens to be a proper subgroup of $B(2, 2)$. We report on the first general results on the representation theory of $\text{UHB}(2, 2)$. In particular the main general results are that the all little groups of $\text{UHB}(2, 2)$ are compact and that the Wigner–Mackey's inducing construction is exhaustive despite the fact that $\text{UHB}(2, 2)$ is not locally compact in the employed Hilbert topology. Some first results on the IRs of $\text{UHB}(2, 2)$ induced from infinite little groups are also reported.