
Let \((G,\theta)\) be a symmetric Lie group, \(\mathfrak{g} = \mathfrak{h} + \mathfrak{q}\) its Lie algebra, \(\mathfrak{g}_c = \mathfrak{h} + i\mathfrak{q}\) the c-dual Lie algebra and \(G_c\) the simply connected Lie group with Lie algebra \(\mathfrak{g}_c\). Motivated by Representation Theory and Quantum Field Theory one considers:

(i) An involutive representation of an open semigroup \(S\) of \(G\) invariant under the involution \(g^* = \theta(g)^{-1}\).

(ii) A reflection positive representation of \((G,\theta)\).

(iii) A local (or virtual) representation of \((G,\theta)\).

In each case the representation leads to a representation of \(\mathfrak{g}_c\) by skewsymmetric operators on a dense domain \(\mathcal{D}\) of a Hilbert sapce \(\mathcal{H}\). Using smooth reproducing kernels and reproducing kernels given by distributions we are able to provide a framework unifying all situations above and to prove that the representation of \(\mathfrak{g}_c\) integrates to a unitary representation of \(G_c\) on \(\mathcal{H}\). Our results apply to infinite dimensional Lie groups as well. This is joint work with Karl-Hermann Neeb and Gestur Olafsson. (Received February 08, 2014)