We discuss relations between spectra and spectral measures of operators of representations listed in the title. We show that for an ergodic countable group action on a standard Borel space, the associated groupoid representation is weakly equivalent to almost all quasi-regular representations and is weakly contained in the Koopman representation (joint result with R. Grigorchuk). Our key example is actions of groups on rooted trees. We show that for a countable group acting on a rooted tree by almost finitary automorphisms the corresponding Kesten-Neumann-Serre measure coincides with certain spectral measure of to the groupoid representation.