ANDERSON LOCALIZATION FOR THE DISCRETE ONE-DIMENSIONAL QUASI-PERIODIC SCHRODINGER OPERATOR WITH DYNAMICS DEFINED BY THE SKEW-SHIFT AND POTENTIAL IN A GEVREY-CLASS

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We consider a discrete one-dimensional quasi-periodic Schrödinger operator whose dynamics is defined by the skew-shift map on the 2-dimensional torus and whose potential function belongs to a Gevrey class and satisfies a generic transversality condition. Assuming that the frequency defining the dynamics satisfies a generic Diophantine condition, and that the coupling constant of the system is large enough, we prove Anderson localization for all energies and most such frequencies. Moreover, in the same perturbative regime we show that the associated Lyapunov exponent is positive and continuous for all energies, with a certain modulus of continuity. These results extend work done by Bourgain, Goldstein and Schlag from the class of non-constant real analytic potentials, to the more general class of non-flat Gevrey-class potentials. It should be noted that due to the weakly mixing properties of the skew-shift, the corresponding operator is expected to behave more like the random case, meaning that these properties should hold for all coupling constants. So far, little is known for low coupling. Moreover, this type of operator, but with the Laplacian replaced by a more general Toplitz operator is physically relevant, through its connections to the kicked rotor equation and this is our next project.