The aim of the paper is to extend results of the Burgain about pointwise convergence of the non-standard ergodic averages (squares) to the case of automorphism of the Hilbert space with cone.

We establish a majorant theorem for the averages over squares. As a consequence of the theorem we show pointwise (or some variant of it) for the case of automorphism acting on von Neumann algebras, operator spaces, etc.