1154-46-2241 **C. Sinan Gunturk*** (`gunturk@cims.nyu.edu`) and **Nguyen T. Thao**. *Random products of projections in Hilbert space: Regularity, absolute convergence, statistics of displacements.*

Let $\mathbf{V} := (V_1, \ldots, V_N)$ be a finite collection of closed linear subspaces of a real Hilbert space H with the associated orthogonal projection operators $P_i : H \to V_i$, $i = 1, \ldots, N$. For any $x_0 \in H$ and any sequence (i_n) taking values in $\{1, \ldots, N\}$, consider the forward trajectory $x_{n+1} := P_{i_n}(x_n)$. It is well-known that (x_n) always converges weakly. Norm convergence holds provided $\mathbf{V}$ satisfies a mild angular condition known as "innate regularity," but otherwise can fail for general $\mathbf{V}$ when $N \geq 3$.

We show that innate regularity implies a stronger sense of norm convergence: For any $\gamma > 0$, there exists $C := C(\mathbf{V}, \gamma) < \infty$ such that

$$\sum_{n=0}^{\infty} \|x_{n+1} - x_n\|^\gamma \leq C\|x_0\|^\gamma$$

uniformly for all x_0 and (i_n). This result is interesting for $\gamma < 2$. In particular, $\gamma = 1$ yields that the displacement series $\sum(x_{n+1} - x_n)$ converges absolutely in H. Quantifying the constant $C(\mathbf{V}, \gamma)$ as $\gamma \to 0$, we also derive an effective bound on the distribution function of the displacement norms.

The result extends naturally to relaxed projections and projections on affine subspaces with nonempty intersection. (Received September 17, 2019)