TRIANGULAR MATRIX CATEGORIES AND RECOLLEMENTS

VALENTE SANTIAGO VARGAS
DEPARTAMENTO DE MATEMÁTICAS, FACULTAD DE CIENCIAS, UNAM

We define the analogous of the triangular matrix algebra to the context of rings with several objects. Given two additive categories $\mathcal{U}$ and $\mathcal{T}$ and $M \in \mathrm{Mod}(\mathcal{U} \otimes \mathcal{T}^{op})$ we will construct the triangular matrix category $\mathbf{\Lambda} := \left[\begin{smallmatrix} \mathcal{T} & 0 \\ M & \mathcal{U} \end{smallmatrix}\right]$ and we prove that there is an equivalence $\Big(\mathrm{Mod}(\mathcal{T}), \mathbb{G}\mathrm{Mod}(\mathcal{U})\Big) \simeq \mathrm{Mod}(\mathbf{\Lambda})$. We will show that if $\mathcal{U}$ and $\mathcal{T}$ are dualizing K-varieties and $M \in \mathrm{Mod}(\mathcal{U} \otimes \mathcal{T}^{op})$ satisfies certain conditions then $\mathbf{\Lambda} := \left[\begin{smallmatrix} \mathcal{T} & 0 \\ M & \mathcal{U} \end{smallmatrix}\right]$ is a dualizing variety.
Finally, we will show that given a recollement between functor categories we can induce a new recollement between triangular matrix categories, this is a generalization of a result given by Chen and Zheng in [1, theorem 4.4].
This is a joint work with Alicia Leon Galeana and Martin Ortíz Morales.

References

[1] Q. Chen, M. Zheng. *Recollements of abelian categories and special types of comma categories.* J. Algebra. 321 (9), 2474-2485 (2009).
[2] A. León-Galeana, M. Ortíz-Morales, V. Santiago, *Triangular Matrix Categories I: Dualizing Varieties and generalized one-point extension.* Preprint arxiv: 1903.03914v1
[3] A. León-Galeana, M. Ortíz-Morales, V. Santiago, *Triangular Matrix Categories II: Recollements and functorially finite subcategories.* Preprint arxiv: 1903.03926v1
[4] S. O. Smalø. *Functorial Finite Subcategories Over Triangular Matrix Rings.* Proceedings of the American Mathematical Society Vol.111. No. 3 (1991).