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"Degenerations of projective space induced by points in an affine building"

ABSTRACT:

Let  $K$  be a discretely valued field with ring of integers  $R$ . To every set of vertices in a certain simplicial complex called the affine building of  $SL_d(K)$ , one can assign a scheme over  $R$ . Its special fiber is a degeneration of projective  $(d-1)$ -space over  $K$ . This scheme has been studied by Mumford[1] in the case  $d = 2$ , and for  $d > 2$  special cases have been studied by Mustafin[2].

We want to understand the general case, combinatorically as well as algebraically. Tropical Geometry seems to provide the right tools. The combinatorial connection between the building and Tropical Geometry has been explored by Joswig, Sturmfels and Yu[3].

[1] D. Mumford: An analytic construction of degenerating curves over complete local rings. *Compos. Math.* 24 (1972) pp. 129-174

[2] G. Mustafin: Nonarchimedean uniformization. *Math. USSR Sbornik* 1978

[3] Michael Joswig, Bernd Sturmfels, Josephine Yu: Affine buildings and tropical convexity. *Albanian J. of Math.* 2007