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**Prakash Belkale** and **Joshua Kiers\*** (jokiers@live.unc.edu). *Extremal rays in the saturated representation branching problem.*

Supposing  $G$  and  $H$  to be semisimple, complex, algebraic groups and  $G$  to be embedded as a subgroup inside  $H$ , one can ask how an irreducible representation of  $H$  decomposes into irreducibles for  $G$ ; this is an example of a “branching problem.” The saturated version asks only when  $V(N\mu)$ , a representation of  $G$ , appears inside  $V(N\lambda)$  for  $H$  for some integer  $N > 0$ . The latter has an answer given by the non-negativity of certain rational linear expressions depending on  $\mu, \lambda$ ; that is, the set of all such  $\mu, \lambda$  form a rational polyhedral cone. This talk will introduce the opposite description of this cone: instead of its inequalities, we will give its extremal rays. The rays come in two parts: simpler ones coming from divisors on the flag variety for  $G \times H$  and less apparent ones coming from the same problem for a pair of semisimple subgroups  $G'$  of  $G$  and  $H'$  of  $H$  (with  $G' \subset H'$ ). This work directly generalizes earlier results in the case  $G$  is diagonally embedded in  $H = G \times G$ . An application of these rays to the saturation conjecture for type  $D_6$  will be given. (Received January 23, 2019)