1145-65-157   **Michael Neilan*** (`neilan@pitt.edu`), 301 Thackeray Hall, 139 University Place, Pittsburgh, PA 15260, and **Johnny Guzman** and **Guosheng Fu**. *Exact smoothed piecewise polynomial sequences on Alfeld splits.*

We develop exact polynomial sequences on Alfeld splits in any spatial dimension and any polynomial degree. An Alfeld split of a simplex is obtained by connecting the vertices of an n-simplex with its barycenter. We show that, on these triangulations, the kernel of the exterior derivative has enhanced smoothness. Byproducts of this theory include characterizations of discrete divergence-free subspaces for the Stokes problem, commutative projections, and simple formulas for the dimensions of smooth polynomial spaces. (Received August 13, 2018)