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**Michael DiPasquale\*** ([dipasqu1@illinois.edu](mailto:dipasqu1@illinois.edu)), Department of Mathematics, 1409 W. Green Street, Urbana, IL 61801. *Castelnuovo-Mumford Regularity of Mixed Spline Spaces*. Preliminary report.

We give a combinatorial bound on the Castelnuovo-Mumford regularity of the algebra  $C^\alpha(\mathcal{P})$  of piecewise polynomial functions on a central polytopal complex  $\mathcal{P}$  with mixed smoothness parameters when  $C^\alpha(\mathcal{P})$  has low projective dimension. We accomplish this bound via an approximation of  $C^\alpha(\mathcal{P})$ , an approach inspired by the proof of the Gruson-Lazarsfeld-Peskine bound for the regularity of curves embedded in projective space.

As a consequence, we bound the degrees  $d$  for which the Hilbert polynomial of  $C^\alpha(\mathcal{P})$ , computed by Billera, Schenck, Geramita, and McDonald, gives the correct dimensions of the corresponding space of splines of degree  $d$ . This recovers and extends previously known estimates from the approximation theory side of the story. (Received September 16, 2014)