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**Joseph Gubeladze\*** ([soso@math.sfsu.edu](mailto:soso@math.sfsu.edu)), Mathematics Department, San Francisco State University, San Francisco, CA 94132. *Hom, tensor, Ker, and Coker constructions for polytopes.*

The set of affine maps between any two convex polytopes is a convex polytope in a natural way; i. e., the category of convex polytopes and affine maps is a closed category. Employing ideas from category theory – such as adjoint functors, representable functors, Yoneda lemma, we will propose universal polytopal constructions as in the title. Actual computation of these objects, as opposed to the existence claims, is a hard problem. In the second half of the talk I will present results obtained jointly with T. Bogart on the 6-dimensional polytope of affine maps between regular  $n$ - and  $m$ -gons. Already there one faces a number of combinatorial, arithmetic and algorithmic challenges. (Received February 26, 2009)