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Journal of Convex Analysis 15 (2008) 635–654

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**Computing Uniform Convex Approximations for Convex Envelopes  
and Convex Hulls**

We provide a numerical procedure to compute uniform convex approximations  $\{f_r\}$  of the convex envelope  $\hat{f}$  of a rational fraction  $f$  defined on a compact basic semi-algebraic set  $\mathbf{D}$ . At each point  $x$  of the convex hull  $\mathbf{K} = \text{co}(\mathbf{D})$ , computing  $f_r(x)$  reduces to solving a semidefinite program. We next characterize  $\mathbf{K}$  in terms of the projection of a *semi-infinite* LMI, and provide outer convex approximations  $\{\mathbf{K}_r\} \downarrow \mathbf{K}$ . Testing whether  $x \notin \mathbf{K}$  reduces to solving finitely many semidefinite programs.