

## Jung Kim

*Poster Presentation: Infinite integration of complex-valued kernels and products of two Bessel functions of first or second kind with real-valued order*

A MATLAB toolbox, IIPBF, for calculating infinite integrals involving a product of two Bessel functions  $J_a(\rho x)J_b(\tau x)$ ,  $J_a(\rho x)Y_b(\tau x)$  and  $J_a(\rho x)J_b(\tau x)$ , for non-negative integer numbers  $a$ ,  $b$  and a well behaved function  $f(x)$ , has been developed and applied to several test cases illustrating the robustness of the toolbox. Based on a Fortran algorithm previously developed for  $J_a(\rho x)J_b(\tau x)$  only, the toolbox implements a three step procedure of adaptive integration, summation and extrapolation. To this end, IIPBF utilizes customized functions from SLATEC library conversion together with `quadgk`, an adaptive Gauss-Kronrod quadrature, to increase the algorithm's speed and accuracy. The applicability of IIPBF to problems in fluid mechanics and imaging science suggest its functionality can be expanded to consider spherical Bessel functions, real valued  $a$ ,  $b$  and complex valued parameters in  $f(x)$ .

Jung Kim graduated from the Department of Applied Mathematics and Statistics, Johns Hopkins University, in 2010 with a degree in Mathematical Finance. This work is joint with Professor J. T. Ratnanather, Center for Imaging Science and Institute for Computational Medicine, Johns Hopkins University.