Meeting: 1003, Atlanta, Georgia, MAA CP J1, MAA Session on Projects and Demonstrations that Enhance a Differential Equations Course, I

1003-J1-1132 **James Hoskin** (aj1112@usma.edu), Dept of Mathematical Sciences, US Military Academy, West Point, NY 10996, **Joseph D. Myers*** (aj5831@usma.edu), Dept of Mathematical Sciences, US Military Academy, West Point, NY 10996, **Bart Stewart** (ab8146@usma.edu), Dept of Mathematical Sciences, US Military Academy, West Point, NY 10928, and **Brian Winkel** (ab3646@usma.edu), Dept of Mathematical Sciences, US Military Academy, West Point, NY 10996. *Demonstrations and Applications of the Fourier Transform and DFT.*

Traditionally we introduce students of differential equations to the Fourier Transform by making the definitions, introducing a few manipulative theorems, and then applying to a couple of diffusion problems on 1-D unbounded domains. This tends to leave students with a very limited view of the transform, how it works, and what it is capable of. In this presentation we illustrate how we use software (Mathematica) in parallel with the standard presentation to help students gain a visceral understanding of the transform. This complementary approach helps students visualize the transforms (both Fourier and DFT), spectra, aliasing, timing of the FFT, smoothing and filtering, convolution and correlation, and basic image processing. (Received October 04, 2004)