EMPFIT: A Computer Code for Fitting EMP Waveforms that Facilitates the Calculation of the Fourier Transform.

Author:	J Michael Clodfelter; HARRY DIAMOND LABS ADELPHI MD.
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Summary:	The computer code EMPFIT provides a method to fit an electromagnetic pulse, as well as other waveforms, with as little as 15 to 30 points. The code EMPFIT allows the user to fit a smooth curve to the data under consideration and to calculate the Fourier transform. An examination of EMPFIT's capabilities is given along with the procedures for using the code. (Author).
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Subjects	• Fourier transformation. • Electromagnetic pulses. • Computer programs. • View all subjects
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Publisher:	Ft. Belvoir Defense Technical Information Center SEP 1978.
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Summary:	This report is a supplement to the original report(HDL-TR-1801) on the computer code EMPFIT and reflects the changeover from a CDC 6600 computer to an IBM 370/168 computer. Also, some additional modifications have been added to increase the usefulness and versatility of the code. EMPFIT is a code that is useful in fitting an electromagnetic pulse, as well as other data, with a simple function that is easily differentiated and Fourier transformed. This report deals only with the aspects necessary to the conversion to the IBM system and also with the new modifications. Material not mentioned in this supplement remains unaffected. (Author).
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Abstract The early time (E1) nuclear high altitude electromagnetic pulse electric field calculated with the code CHAP is compared with the field given by an integral solution of Maxwell's equations, also known as the Jefimenko equation, to aid our current

understanding on the factors that affect the time dependence of the electromagnetic pulse (EMP). For a fair comparison the CHAP current density is used as a source in the Jefimenko equation. At first, the comparison is simplified by neglecting the conduction current and replacing the standard atmosphere with a constant density air slab. The simplicity of the resultant current density aids in determining the factors that affect the rise, peak and tail of the EMP electric field versus time. The explicit 3-D approach of the Jefimenko equation confirms the importance, as described in the high-frequency approximation, of sources off the line-of-sight and the time dependence of the time derivative of the current density in shaping the EMP electric field time dependence. This conclusion also holds when the conduction current and the standard atmosphere are properly accounted for. Comparison of the CHAP electric field with the Jefimenko electric field is also another way to validate the equations developed under the high-frequency/outgoing wave approximation.