THESIS TITLE CENTERED ON THE PAGE VERTICALLY AND HORIZONTA	LLY,
IN ALL UPPER CASE LETTERS AND IN AN INVERTED PYRAMID	
SHAPE. MATH MODE: $\frac{2^{15}}{\pi}$	

Copyright by Student Name 2020 All Rights Reserved A thesis submitted to the Faculty and the Board of Trustees of the Colorado School of Mines in partial fulfillment of the requirements for the degree of Doctor of Philosophy (Computer Science).

Golden, Colorado		
Date		
	Ciam od.	
	Signed:	Student Name
	Signed:	
		Dr. Thesis Advisor Thesis Advisor
	Signed:	
		Dr. Co-Advisor Thesis Advisor
Golden, Colorado		
Date		
	Signed:	
		Dr. Department Head Professor and Head Department of XXX

## THESIS TITLE CENTERED ON THE

## PAGE VERTICALLY AND HORIZONTALLY,

## IN ALL UPPER CASE LETTERS AND IN AN INVERTED PYRAMID SHAPE. MATH

MODE:  $\frac{2^{15}}{\pi}$ 

Thesis title centered on the page vertically and horizontally, in all upper case letters and in an inverted

pyramid shape. Math mode:  $\frac{2^{15}}{\pi}$ 

THESIS TITLE CENTERED ON THE

PAGE VERTICALLY AND HORIZONTALLY,

IN ALL UPPER CASE LETTERS AND IN AN INVERTED PYRAMID SHAPE. MATH

MODE:  $\frac{2^{15}}{\pi}$ 

Thesis title centered on the page vertically and horizontally, in all upper case letters and in an inverted

pyramid shape. Math mode:  $\frac{2^{15}}{\pi}$ 

by

author

alibrating the response of a GPR system is essential for making measurements of subsurface materials properties. Duke (1990) calibrated the overall response of a GPR system by making measurements of the . . . 1.1 Background and Previous Work This chapter describes the methodology that has been used to determine the response of an impulse GPR. The characterization includes a response function for the receiving electronics, simulations . . . 1.2 Signal Processing Tools There are many techniques for making high frequency electrical measurements in electrical networks and antenna systems, and there are also many methods for manipulating the data from these measurements . . . 1.2.1 Convolution and Deconvolution Methods Convolution is a mathematical operation that can be used to describe how a linear network element modifies a signal as the signal passes through it . . . 1.2.2 Scattering Parameters

alibrating the response of a GPR system is essential for making measurements of subsurface materials properties. Duke (1990) calibrated the overall response of a GPR system by making measurements of the . . . 1.1 Background and Previous Work This chapter describes the methodology that has been used to determine the response of an impulse GPR. The characterization includes a response function for the receiving electronics, simulations . . . 1.2 Signal Processing Tools There are many techniques for making high frequency electrical measurements in electrical networks and antenna systems, and there are also many methods for manipulating the data from these measurements . . . 1.2.1 Convolution and Deconvolution Methods Convolution is a mathematical operation that can be used to describe how a linear network element modifies a signal as the signal passes through it . . . 1.2.2 Scattering Parameters