

# SOLVE IMPLICIT EQUATIONS INSIDE YOUR WORKSHEET

Anilkumar M, Dr. Sreenivasan E, and Dr. Raghunathan K

Kicrosoft Excel - colebrook												
1	Ele	Edk	Yjew	Insert	Form	hat	$\underline{I}ools$	Data	₩inda	w U	elp	
Arial • 10 • B X ≡ ≡ ≡ ⊠ 1/2 · 22 •											· 💁 - 🖌	
	G2	1	Ŧ	fs:	_							
	F	G		н				I	J		ĸ	L
4												
5		NO VBA - NO MACROS - NO SOLVER - NO GOAL SEEK										
6		NO Newton Raphson head aches										
7		USE ALGORITHM WITHIN WORKSHEET										
8		15 digit solution in Lightning speed										
9												
10				1			(	e	2	51	1	
11		$\frac{1}{100} = -2 \log \left  \frac{1}{100} + \frac{1}{1000} \right $										
12			$\sim$	1 ·			( -	. /	Re	$\sqrt{1}$	9	
13												
14		Ro	ughnes	ss Facto	r R		- 50	000				
15							roug	hness				
16		Rei	lative R	loughne	ss e		0.0	100				
17												_
18		Frie	tion F	actor f			0.	0472	59078	6857	9590	
19												_
00												

# NOVEL TECHNIQUES FRPCAD Monograph Series

#### SOLVE IMPLICIT EQUATIONS

#### **INSIDE YOUR WORKSHEET**

#### (With special reference to Microsoft Excel)

Anil Kumar M<sup>1</sup> Chief, FRPCAD Consultants, Kadirur, Kerala, India 670642

**Dr E Sreenivasan** Dept of R&D The Western India Plywoods Ltd Kerala, India

**Dr K Raghunathan** Scientific Advisor FRPCAD Consultants Kerala, India

**FRPOCAD Publications Division** A N Nivas, Kadirur, Kannur Dist, Kerala St. India www.FRPdesigns.com, email: frpcad@gmail.com

<sup>&</sup>lt;sup>1</sup> Author for communication, email: <u>frpcad@gmail.com</u>

#### SOLVE IMPLICIT EQUATIONS

## **INSIDE YOUR EXCEL WORKSHEET**

## The ability to simplify means to eliminate the unnecessary, so that the necessary can speak

- Hans Hofmann

## Contents

#### Preface

#### **1** Spread Sheet Fundamentals

- 1. Introduction
- 2. Spreadsheets
- 3. Worksheet
- 4. Cells
- 5. Cell Stability
- 6. Advantages of Spreadsheet Programming
- 7. VBA in Excel

#### 2 Numerical Capabilities of Spreadsheets

- 1. Precision
- 2. Excel Limits and Limitations
- 3. Scientific/Engineering Limits
- 4. Engineers and Scientists Can Relax!

#### **3 Excel Basics**

- 1. References
  - a. Entering Formulas
  - b. Reference by Range
  - c. Reference by Cell/Range Names
- 2. Operators
  - a. Arithmetic Operators
  - b. Comparison Operators
- 3. Functions

#### **4 IF Logical Function**

- 1. Introduction
- 2. Conditions
- 3. A Simple IF equation
- 4. Simple IF with references
- 5. Nested IF
- 6. Maximum Number of Nests
- 7. Information Functions as Conditions within IF

#### **5** Information Functions

- 1. ISERROR Function
- 2. Major Error Types
- 3. #Div/0! Error
- 4. #### Error
- 5. #REF! Error

#### 6 Circular References

- 1. Examples
- 2. Activating Circular Reference
- 3. A "Working" Circular Reference
- 4. Maximum Iteration
- 5. Maximum Change

#### 7 Advanced Worksheet Iterations

- 1. Applications
- 2. Simple Iteration
- 3. Understanding the Convergence
- 4. Variations of Same Equation
- 5. Mechanism of Iteration
- 6. Time Consumed for Iteration
- 7. Optimum Number of Iterative Cycles

#### **8 Controls for Advanced Iterations**

- 1. Concepts
  - a. Iterating Cells
  - b. Seed
  - c. Counter
  - d. Control Cell
  - e. ON and OFF Control
  - f. Reset Control
  - g. Iteration Cycles
  - h. Indicator
- 2. Creating Seed
- 3. Introducing ON/OFF Control
- 4. Creating a Counter
- 5. Creating a Indicator
  - a. 15 digit precision
  - b. 5 digit precision
- 6. Creating ON/OFF/RESET Control

#### 9 Solving of Colebrook Equations

- 1. Darcy-Weisbach Equation
- 2. Moody Diagram
- 3. Colebrook Equation
- 4. Relative Roughness
- 5. Solving Colebrook Equation

#### **10 Fixed Point Iteration- Basics**

- 1. Introduction
- 2. Examples
- 3. Solution
- 4. Iteration
- 5. Fixed Point
- 6. Fixed Point with Colebrook Equation
- 7. Divergence Conditions

#### **11 Sample Worksheets**



#### **ABOUT THE AUTHOR**

Anil Kumar Madappally did his post-graduation in chemistry and in chemical engineering from Indian Institute of Technology, Madras. He worked in various industries in key technical positions. He is having more than 15 years of industrial experience.

At present he is associated with The Western India Plywoods Ltd, Asia's largest lignocellulosic panel processing unit as *Head, Research and Development*. He is also a consultant in the field of FRP chemical process plant equipments, design of various fluid handling systems, and chairs as chief of the consultation company FRPCAD, www.frpdesigns.com.

#### HIS OTHER TITLES

Excel Circular Reference – Applications Duct Design Handbook Industrial Fan – Fundamentals Principles, Energy efficiency, and Selection Design and Construction of FRP Horizontal Tanks A Handbook of UV Coatings Technology Formulations: Fundamentals, Manipulations, Calculations and Data Management

The author can be contacted at frpcad@gmail.com any discussions and your suggestions will be considered for our next edition.

