

# BCS<sup>©</sup> New Pipeline Two Phase Flow calculations using Lockhart\_Martinelli\_Curve

Case study [1] – Assuming Liquid turbulent and Gas Turbulent

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**Abstract**— This article is a guide to scientist and engineers who need to use a standard mathematically charts or curves to find x, y values on any drawing curve. The idea is simple as the human one steps to find the results but it converted by our developers to be automated (~ 30% AI) and 70 % input data from the user. The current model is solving all parameter of Two Phase Flow in [Turbulent] mode and this is the begging, we will complete other modes as soon as possible after check the succession of this way. Our website design has applications developed to help in all fields of engineering and scientists.

## Introduction

In the beginning, the application simplified the recognition of curves by simple [Coloured them] as you know most of scientist or engineering charts and curves are black and white in most books.

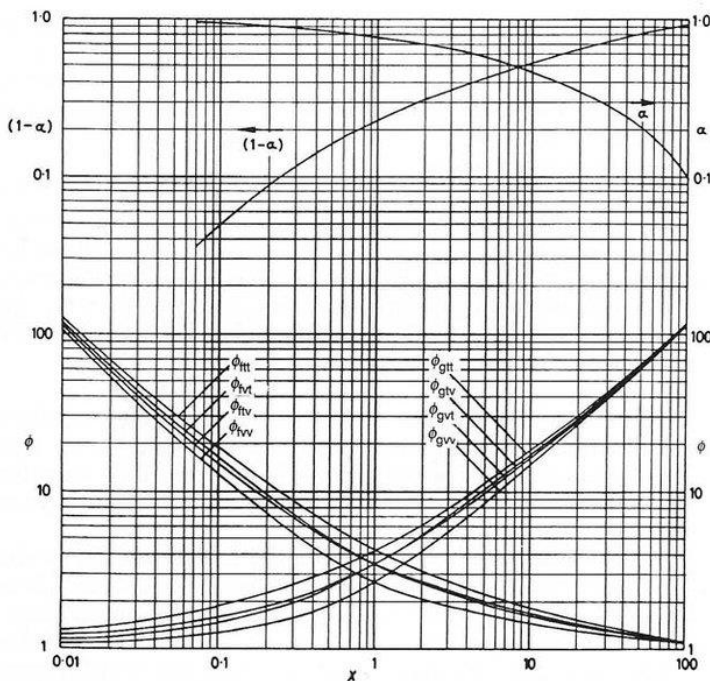


Fig.1 Lockhart Martinelli

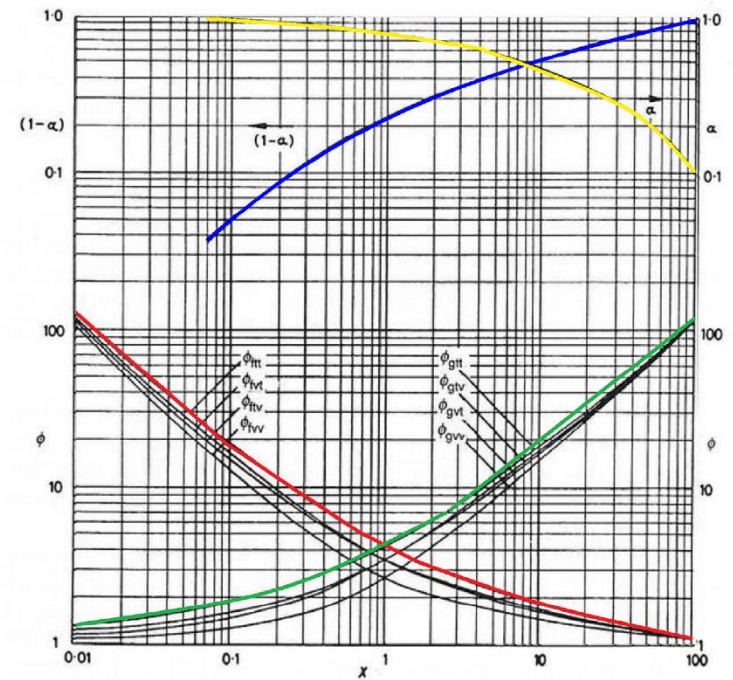


Fig.2 Coloured Lockhart Martinelli

- 1- Using sub routine to coloured the charts we will get The below results.
- 2- Keep in mind that we almost prefer to use main colours.
- 3- Resizing the chart image to suitable scale say (1000 pixels)
- 4- As you see the [X] parameter value in y axis in log (10) scale.
- 5- Using some tricks of [AI] functions we developed a routine To position the [X] value and move up to catch the selected curve [using pixel colour].
- 6- The next step is easy, when the colour is founded return the [ $\phi$ ] value.

- 7- After experimental we find that as the big size of chart as it gives you accurate results.
- 8- You can use you experience in coding to create the same for your researching or use our model in the website.
- 9- If you need any help for the same technique with another charts or curves don's hastate to contact us.

Fig. 3 Simple design of input screen

- 10- As a test we enter these values which calculated manually.
- 11- And the results is accurate on 3 decimal value.
- 12- The [X] parameter using windows calculator = 0.794
- 13- The calculated [X] parameter using our software = 0.696
- 14- And the X position on the chart scale is 443

Fig. 4 First

- 15- Passing the X value to the routine to find coloured point [y] value of the selected curve.

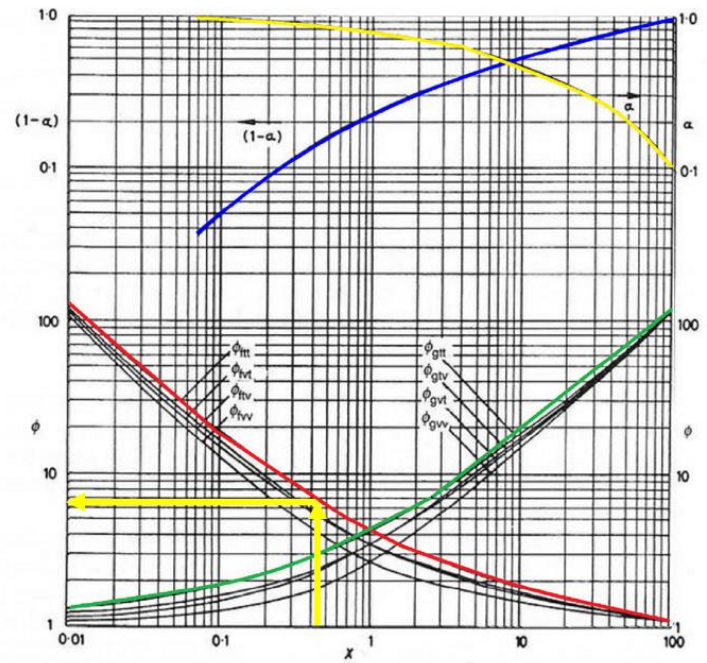


Fig. 5 Succession get value from the selected [Red] curve.

Fig. 6 Get all values from the selected [Red] curve.

## I. DESIGN STEPS

Use your preferred programming language to set the code.

- a) Start design flowchart of the idea.
- b) Declare parameters variables.
- c) Build attractive start and log in screens.
- d) Build modern view Form for inputs and outputs.
- e) Download the best resolution curve from the internet.
- f) Resize the curve to be 1000 X 1000 pixels.
- g) Convert formula and equations to the mathematically code.
- h) Test the input before enter to application.
- i) Record the output and compare between the application results.
- j) Publish the application to friend and colleagues to test.

- k) Publish the application to the marketplace.
- l) You can develop aa android version if you know code.

## For Loop Flowchart

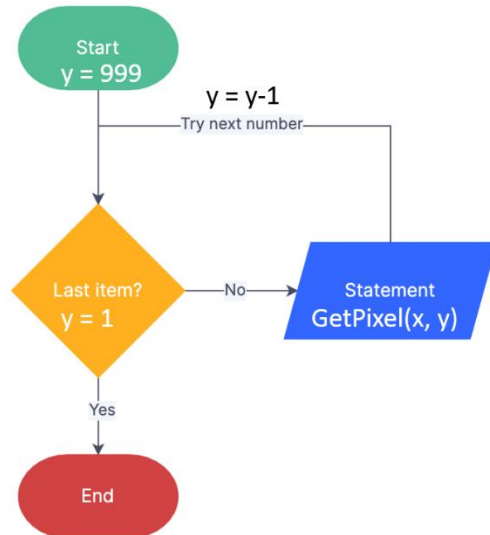


Fig. 7 Flowchart of loop to get pixel colour from the selected [Red] curve.

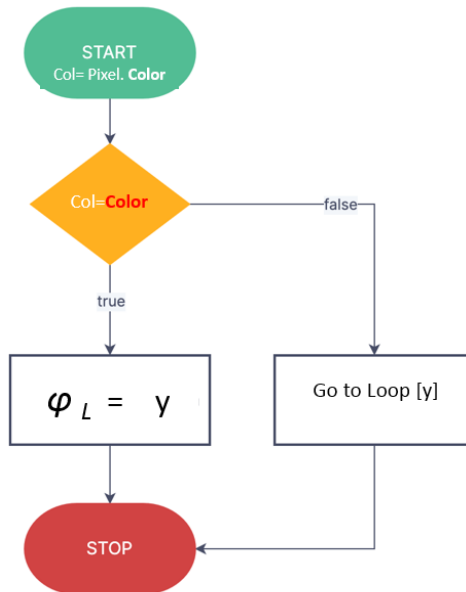


Fig. 8 Flowchart check pixel colour = [Red].

# Pipeline Two Phase Flow Calculations

Link to the trail version:

<https://www.binarycodesoft.com/store-1/pipeline-two-phase-flow-calculations-lockhart-martinelli-s-model-curves-trail-version>

Links to full version:

<https://www.binarycodesoft.com/store-1/pipeline-two-phase-flow-calculations-lockhart-martinelli-s-model-curves-full-version-copy>

## References

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2004 [1]

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## II. CONCLUSIONS

This paper is a sample of how to use code technique to get values from curves & charts with high accuracy; you can find more details of these methods in the website

(<https://www.binarycodesoft.com>)