



# Computer Aided Design Tool for Distillation Column

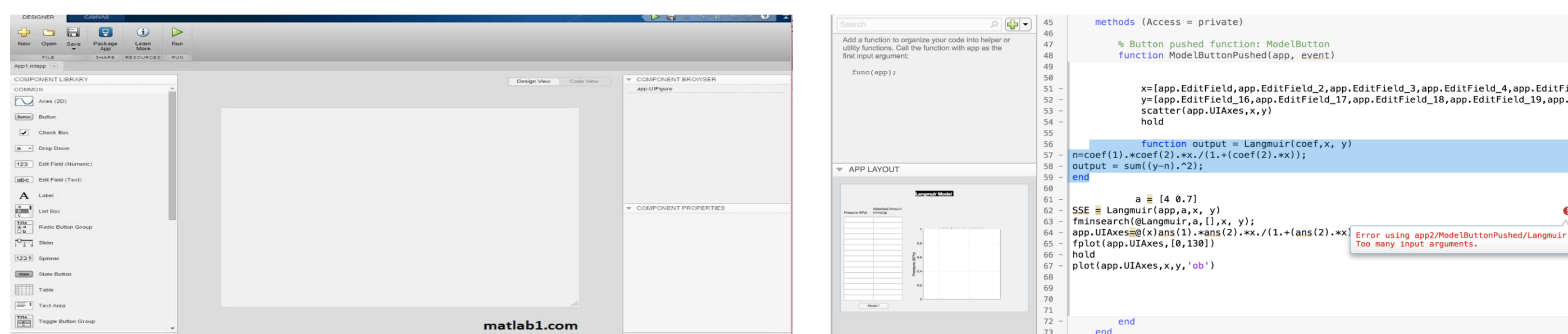
## Abstract

This project presents a friendly-user and reliable computer aided design package for the design calculation of trayed-distillation column that can be used in educational and professional sectors applications. The project enables users to perform several distillation column scenarios in an efficient way using interactive user interface (UI). The present application can be used in both design calculations, as well as to check for the performance of the distillation column.

## Design and Implementation

Design steps:

1. Physical property estimation or search
2. Choosing a plate spacing
3. Calculating the diameter of a column
4. Calculating the plate layout (downcomer area, active area, hole area, hole size, and weir height)
5. Checking for weeping rate
6. Checking for plate pressure drop
7. Checking for downcomer liquid back-up
8. Checking for residence time
9. Checking for entrainment
10. Cost estimating



The software used to design a distillation column is MATLAB's (App Designer)

## Conclusion

This present software tool is aimed to assist users in teaching, facilitates self-learning of students (especially in design courses) and can provide adequate analysis of design/rating distillation column in industries. Results of this program shows excellent performance when compared with hand calculation examples. This present software tool is easy to use, reliable and facilitates self-learning of students and also helps in better analysis of design/rating distillation column in industries.

## Objective and Motivation

Objectives:

- 1) Perform a professional friendly-user application using MATLAB's app designer that assists and supports the user in creating and executing calculations for the design/rating distillation columns.
- 2) Enable users to perform the design effectively and on-time.
- 3) help senior students at the chemical engineering department to perform design/rating distillations columns effectively.

Motivation:

Performing design calculation using hand calculation is time consuming and the calculations are prone to error. Thus, this project's inspiration is to overcome the problems associated with the hand calculation type by performing a friendly user program for an appropriate distillation column design.

## Results

Using equations relating to distillation columns, the user interface (UI) system computed the diameters for enriching and stripping to be 1.181m and 2.266m, respectively. Other results such as weeping point, pressure drop, down liquid backup, and residence time were discovered, and when compared to the hand calculation example results, there was a insignificant deviation. However, because different correlations were employed in the calculation, a significant deviation was obtained for the entrainment. Using Van Winkle correlation. Efficiency is found to be in the 60-70 percentage range. The purchase cost for year 2020 found to be \$208765.394.

☐ Results of this program shows excellent performance.

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