

# DSOySP

## Introducción a DWSIM

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JTP: Dr. Néstor H. Rodríguez  
Aux. 1ra: Dr. Juan I. Manassaldi

## DWSIM Wiki

- DWSIM is an open-source CAPE-OPEN compliant chemical process simulator for Windows and Linux.
- DWSIM is built on top of the Microsoft .NET and Mono Platforms and features a Graphical User Interface (GUI), advanced thermodynamics calculations, reactions support and petroleum characterization / hypothetical component generation tools.
- DWSIM is able to simulate steady-state, vapor–liquid, vapor–liquid-liquid, solid–liquid and aqueous electrolyte equilibrium processes.

# DWSIM Wiki

- Thermodynamic models:
  - PC-SAFT, FPROPS
  - CoolProp
  - Peng–Robinson
  - Peng–Robinson-Strøjek-Vera (PRSV2)
  - Soave–Redlich–Kwong
  - Lee-Kesler
  - Lee-Kesler-Plöcker
  - UNIFAC(-LL)
  - Modified UNIFAC (Dortmund)
  - Modified UNIFAC (NIST)
  - UNIQUAC
  - NRTL
  - COSMO-SAC
  - Chao-Seader
  - Grayson-Streed
  - Extended UNIQUAC
  - Raoult's Law
  - IAPWS-IF97 Steam Tables
  - IAPWS-08 Seawater
  - Black-Oil
  - Sour Water

## DWSIM Wiki

- Unit operations:
  - Mixer
  - Splitter
  - Separator
  - Pump
  - Compressor
  - Expander
  - Heater
  - Cooler
  - Valve
  - Pipe Segment
  - Shortcut Column
  - Heat Exchanger
  - Reactors
  - Component Separator
  - Orifice Plate
  - Distillation/Absorption Columns
  - Solids Separator
  - Cake Filter

# DWSIM Wiki

- Utilities:
  - Binary Data Regression
  - Phase Envelope
  - Natural Gas Hydrates
  - Pure Component Properties
  - True Critical Point
  - PSV Sizing
  - Vessel Sizing
  - Spreadsheet and Petroleum Cold Flow Properties
- Tools:
  - Hypothetical Component Generator
  - Bulk C7+/Distillation Curves Petroleum Characterization
  - Petroleum Assay Manager
  - Reactions Manager and Compound Creator;
  - Process Analysis and Optimization:
  - Sensitivity Analysis Utility
  - Multivariate Optimizer with bound constraints;
- Extras:
  - Support for Runtime Scripts
  - Plugins and CAPE-OPEN Flowsheet Monitoring Objects.

# Descarga e Instalación

https://dwsim.org/



DWsim



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[DWSIM SOCIAL RESPONSIBILITY PROGRAM](#)

[DOWNLOAD](#)

[ABOUT](#)

## Chemical Process Simulation for Everyone

DWSIM for Desktop is free and open-source.

[DOWNLOAD NOW](#)

[DISCOVER DWSIM PRO](#)

[SUPPORT THE PROJECT](#)

[VIEW DOCUMENTATION](#)

[VIEW PUBLICATIONS](#)



## Feature-Complete

DWSIM is a [CAPE-OPEN compliant](#) Chemical Process Simulator and has an easy-to-use graphical interface with many features previously available only in commercial chemical process simulators.



# Descarga e Instalación



## WINDOWS (64-BIT)

Installer Package  
(313 MB)

[DOWNLOAD](#)

Portable Package  
(353 MB)

[DOWNLOAD](#)

Requires Microsoft .NET 4.6.2 or newer



## MACOS (64-BIT)

Disk Image File  
(197 MB)

[DOWNLOAD](#)



## LINUX (64-BIT)

64-bit Debian Installer Package  
(231 MB)

[DOWNLOAD](#)

Portable Package  
(205 MB)

[DOWNLOAD](#)

Requires .NET 8 and IPOPT

# Descarga e Instalación

## Support DWSIM open-source development

Support the DWSIM open-source development with a single, one-time donation or with a monthly subscription!

By becoming a patron, you will support me (Daniel Wagner) directly and shape the future development of DWSIM while getting access to exclusive goodies, depending on your subscription tier. You can also say thank you with a one-time donation by getting me a coffee or, if you're from Brazil, you can do me a Pix transfer and I'll buy the coffee myself. ☺👍

One-Time Donation



Pix (Brasil)



Chave Pix:

0f0c6cf5-2489-4d03-  
b7a8-3a5fd22498a2

4.99 USD/month



This gets your name  
on DWSIM's Splash  
Screen.

[MORE  
INFORMATION](#)

9.99 USD/month



This gets your name  
on DWSIM's Splash  
Screen and access to  
private WhatsApp and  
Discord groups.

[MORE  
INFORMATION](#)

29.99 USD/month



This gets you extra  
DWSIM components  
(Property Packages,  
Unit Ops and Plugins),  
your name on DWSIM's  
Splash Screen, access  
to private WhatsApp  
and Discord groups  
and other goodies.

[MORE  
INFORMATION](#)



# Descarga e Instalación

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## DWSIM - Open Source Process Simulator Files

Simulate chemical processes using advanced thermodynamic models

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[Tickets \(GitHub\)](#)

[Tickets \(Inactive\)](#)



**Download Latest Version**

DWSIM\_v902\_win64\_setup.exe (292.1 MB)



Get an email when there's a new version of DWSIM - Open Sourc...

Enter your email address

Next



Home

Name	Modified	Size	Downloads / Week
<a href="#">DWSIM</a>	2025-02-28		2,851
Totals: 1 Item			2,851

# Descarga e Instalación

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## DWSIM - Open Source Process Simulator Files

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Summary

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Enter your email address

Next



Home / DWSIM

Name

Modified

Size

Downloads / Week

Parent folder

[DWSIM 9.0](#)

2025-04-23

2,708

[DWSIM 8.8](#)

2024-11-14

3

[DWSIM 8.7](#)

2024-04-22

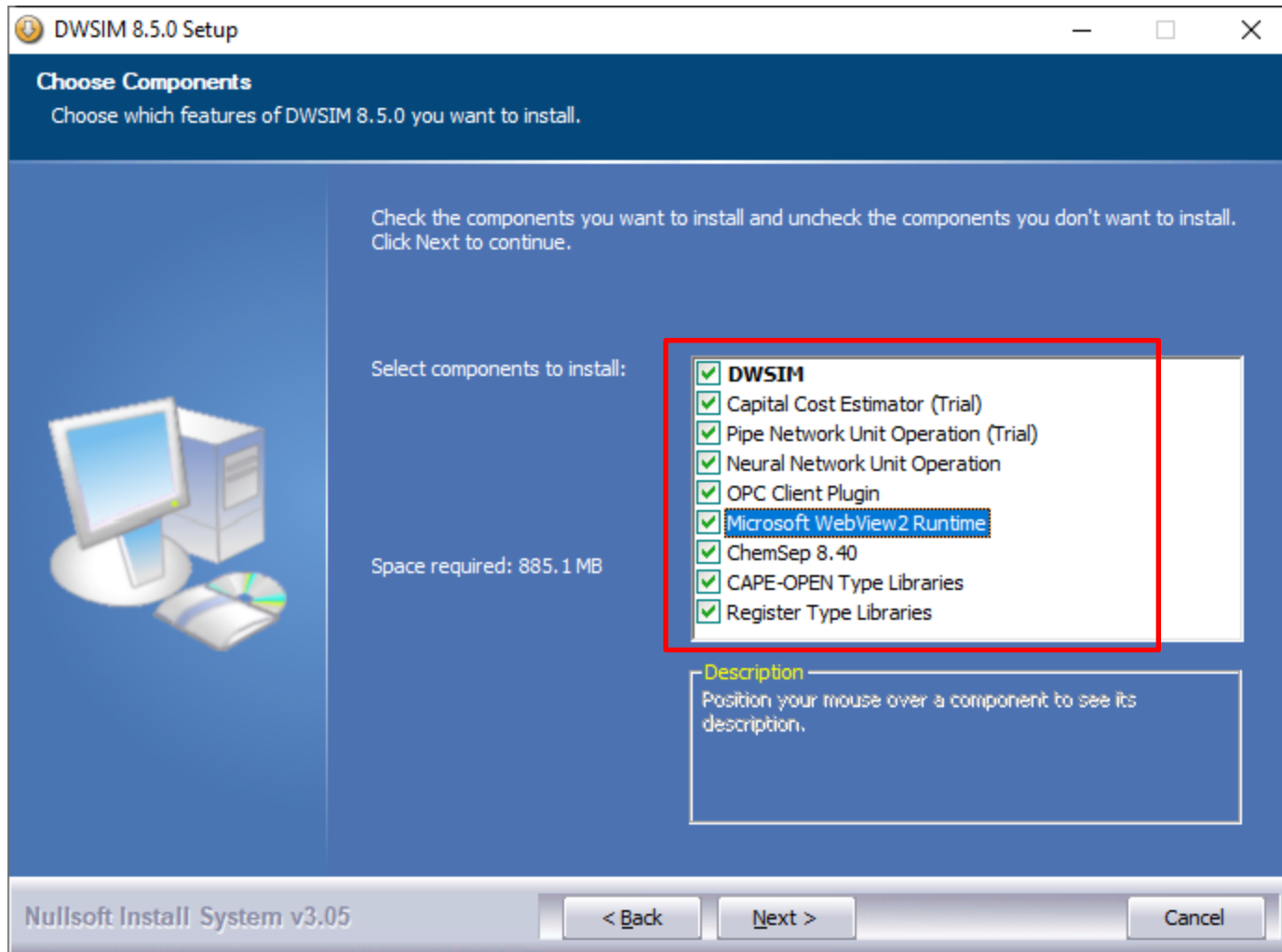
2

[DWSIM 8.6](#)

2024-01-24

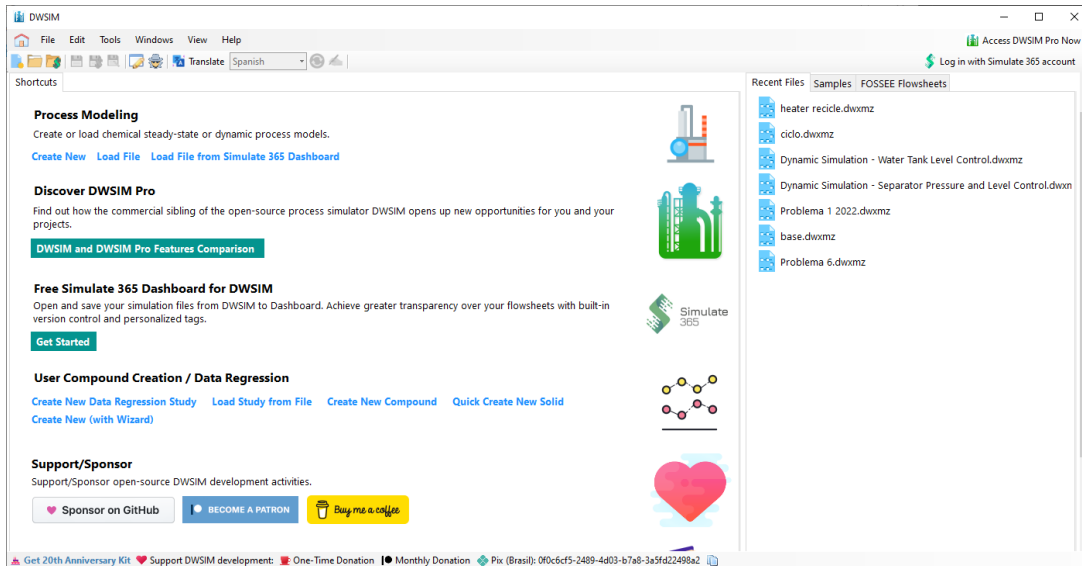
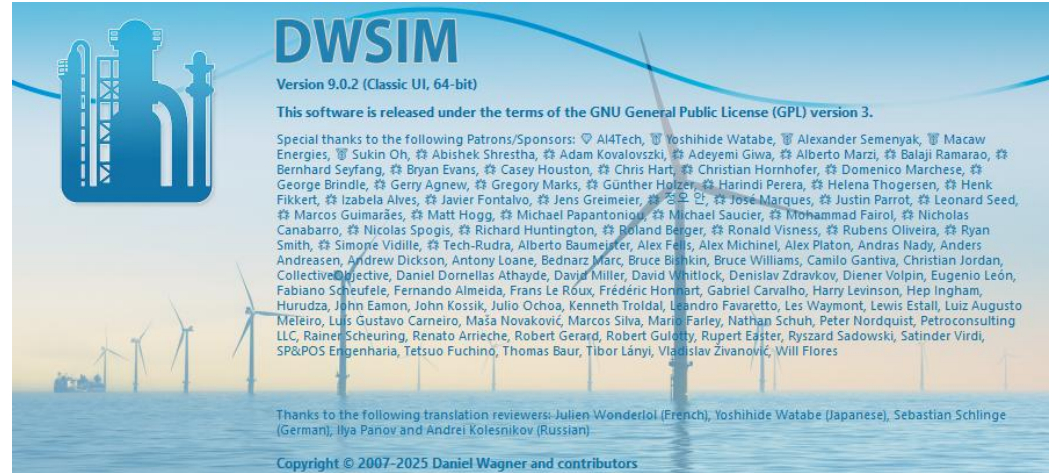
4

# Instalación del software



Tildar todas las opciones

# Inicio del software



# Ventana de bienvenida

DWSIM

File Edit Tools Windows View Help

Translate Spanish

Access DWSIM Pro Now

Log in with Simulate 365 account

### Shortcuts

#### Process Modeling

Create or load chemical steady-state or dynamic process models.

[Create New](#) [Load File](#) [Load File from Simulate 365 Dashboard](#)

#### Discover DWSIM Pro

Find out how the commercial sibling of the open-source process simulator DWSIM opens up new opportunities for you and your projects.

[DWSIM and DWSIM Pro Features Comparison](#)

#### Free Simulate 365 Dashboard for DWSIM

Open and save your simulation files from DWSIM to Dashboard. Achieve greater transparency over your flowsheets with built-in version control and personalized tags.

[Get Started](#)

#### User Compound Creation / Data Regression

[Create New Data Regression Study](#) [Load Study from File](#) [Create New Compound](#) [Quick Create New Solid](#)

[Create New \(with Wizard\)](#)

#### Support/Sponsor

Support/Sponsor open-source DWSIM development activities.


[Sponsor on GitHub](#) [BECOME A PATRON](#) [Buy me a coffee](#)

#### Recent Files

- heater recycle.dwxmz
- ciclo.dwxmz
- Dynamic Simulation - Water Tank Level Control.dwxmz
- Dynamic Simulation - Separator Pressure and Level Control.dwxn
- Problema 1 2022.dwxmz
- base.dwxmz
- Problema 6.dwxmz

[Get 20th Anniversary Kit](#) [Support DWSIM development](#) [One-Time Donation](#) [Monthly Donation](#) [Pix \(Brasil\): 0f0c6cf5-2489-4d03-b7a8-3a5fd22498a2](#)

# Asistente de configuración

←  Simulation Configuration Wizard

## Introduction

- ▶ **Introduction**
- ▶ Compounds
- ▶ Property Packages
- ▶ System of Units
- ▶ Behavior
- ▶ Undo/Redo

Welcome to the simulation configuration wizard.

In the next pages you will be able to add compounds, property packages, set the system of units and configure specific parameters for a new simulation.

Click "Next" to continue.

Puede cerrarse y configurarse manualmente

Close Wizard and go to the Simulation Configuration Window

Next >

Cancel

# Selección de compuestos

← Simulation Configuration Wizard

## Compounds

- ✓ Introduction
- ▶ **Compounds**
- ▶ Property Packages
- ▶ System of Units
- ▶ Behavior
- ▶ Undo/Redo

Select the compounds that you want to add to the simulation. Use the textbox to search and select a compound in the list. Click "Next" to continue.

Added	Name	CAS Number	Formula	Source Database	CP
<input checked="" type="checkbox"/>	Methane	74-82-8	CH <sub>4</sub>	ChemSep	<input checked="" type="checkbox"/>
<input type="checkbox"/>	Ethane	74-84-0	CH <sub>3</sub> CH <sub>3</sub>	ChemSep	<input checked="" type="checkbox"/>
<input type="checkbox"/>	Propane	74-98-6	CH <sub>3</sub> CH <sub>2</sub> CH <sub>3</sub>	ChemSep	<input checked="" type="checkbox"/>
<input type="checkbox"/>	N-butane	106-97-8	CH <sub>3</sub> (CH <sub>2</sub> ) <sub>2</sub> CH <sub>3</sub>	ChemSep	<input checked="" type="checkbox"/>
<input type="checkbox"/>	N-pentane	109-66-0	CH <sub>3</sub> (CH <sub>2</sub> ) <sub>3</sub> CH <sub>3</sub>	ChemSep	<input checked="" type="checkbox"/>
<input type="checkbox"/>	N-hexane	110-54-3	CH <sub>3</sub> (CH <sub>2</sub> ) <sub>4</sub> CH <sub>3</sub>	ChemSep	<input checked="" type="checkbox"/>
<input type="checkbox"/>	N-heptane	142-82-5	CH <sub>3</sub> (CH <sub>2</sub> ) <sub>5</sub> CH <sub>3</sub>	ChemSep	<input checked="" type="checkbox"/>
<input type="checkbox"/>	N-octane	111-65-9	CH <sub>3</sub> (CH <sub>2</sub> ) <sub>6</sub> CH <sub>3</sub>	ChemSep	<input checked="" type="checkbox"/>
<input type="checkbox"/>	N-nonane	111-84-2	CH <sub>3</sub> (CH <sub>2</sub> ) <sub>7</sub> CH <sub>3</sub>	ChemSep	<input checked="" type="checkbox"/>
<input type="checkbox"/>	N-decane	124-18-5	CH <sub>3</sub> (CH <sub>2</sub> ) <sub>8</sub> CH <sub>3</sub>	ChemSep	<input checked="" type="checkbox"/>
<input type="checkbox"/>	N-undecane	1120-21-4	CH <sub>3</sub> (CH <sub>2</sub> ) <sub>9</sub> CH <sub>3</sub>	ChemSep	<input checked="" type="checkbox"/>
<input type="checkbox"/>	N-dodecane	112-30-2	CH <sub>3</sub> (CH <sub>2</sub> ) <sub>10</sub> CH <sub>3</sub>	ChemSep	<input checked="" type="checkbox"/>

Search



Add from Other Sources >



View Selected

Added Compounds

Next >

Cancel

# Selección de paquetes de propiedades fisicoquímicas

← Simulation Configuration Wizard

## Property Packages

- ✓ Introduction
- ✓ Compounds
- ▶ **Property Packages**
- ▶ System of Units
- ▶ Behavior
- ▶ Undo/Redo

Select and Add the Property Packages that you want to use in your simulation. The first on the list will be used by default by all flowsheet objects. Click "Next" to continue.

Available Property Packages

Filter By: Most Popular

- ✓ Peng-Robinson (PR)
- ✓ Soave-Redlich-Kwong (SRK)
- ✓ Soave-Redlich-Kwong (SRK) Advanced
- ✓ CoolProp
- ✓ Extended CoolProp
- ✓ Raoult's Law
- ✓ Peng-Robinson-Stryjek-Vera 2 (PRSV2-VL)
- ✓ ThermoC Bridge
- ✓ Peng-Robinson 1978 (PR78) for Petroleum Indu
- ✓ REFPROP

Added Property Packages

Name	Type
------	------

Add

Info

Selection Help

Recommended packages are marked with a ✓, but you can use all available packages without restrictions.


Override Phase Equilibria calculation settings?  Leave as default (SVLLE)  VLE (faster)  VLLE/LLE  Do not calculate

Next >

Cancel



# Selección de unidades

←  Simulation Configuration Wizard

## System of Units

- ✓ Introduction
- ✓ Compounds
- ✓ Property Packages
- ▶ **System of Units**
- ▶ Behavior
- ▶ Undo/Redo

Select the desired System of Units for your simulation. You can change individual units by selecting a custom system (other than SI, CGS or ENG).

Click "Finish" to exit the wizard and start designing the simulation model.


System of Units

Property	Unit	Property	Unit
Temperature	K	Pressure	Pa
Mass Flow Rate	kg/s	Molar Flow Rate	mol/s
Volumetric flow rate	m <sup>3</sup> /s	Specific Enthalpy	kJ/kg
Specific Entropy	kJ/[kg.K]	Molecular Weight	kg/kmol
Density	kg/m <sup>3</sup>	Surface Tension	N/m
Heat Capacity	kJ/[kg.K]	Thermal Conductivity	W/[m.K]
Kinematic Viscosity	m <sup>2</sup> /s	Dynamic Viscosity	Pa.s
Temperature Difference	K	Pressure Difference	Pa
Length/Head	m	Energy Flow	kW
Time	s	Volume	m <sup>3</sup>
Molar Volume	m <sup>3</sup> /kmol	Area	m <sup>2</sup>
Diameter/Thickness	mm	Force	N

Next >

Cancel

# Opciones del software

←  Simulation Configuration Wizard

## Behavior

- ✓ Introduction
- ✓ Compounds
- ✓ Property Packages
- ✓ System of Units
- ▶ **Behavior**
- ▶ Undo/Redo

### Smart Object Solving

DWSIM can skip calculations of flowsheet objects if none of its input parameters (including inlet streams) have changed since the last successful calculation. This feature is disabled by default. You can change it later in Edit > Simulation Settings > Behavior.

Activate Smart Object Solving

### Fail-Safe Flash Calculations

If the selected equilibrium calculation method fails, DWSIM can try it again using a simple VLE procedure assuming ideal behavior for the mixture. Would you like to enable this feature? This is a Property Package-level setting and can be changed later in the Property Package Settings editor > Equilibrium Calculation Settings.

Activate Fail-Safe Flash Calculations

### Object Editing Behavior


The default behavior for editing flowsheet objects is single-click to open the editor. Would you like to switch this to double-click editing? This is a global setting that can be changed later in Edit > Global Settings > Flowsheet.

Activate Double-Click to Open Editors

Next >

Cancel

# Opciones del software

←  Simulation Configuration Wizard

## Undo/Redo

- ✓ Introduction
- ✓ Compounds
- ✓ Property Packages
- ✓ System of Units
- ✓ Behavior
- ▶ **Undo/Redo**

### Undo/Redo Operations

Would you like to enable full Undo/Redo capabilities? This feature is disabled by default and can make the interface less responsive on complex flowsheets.

You can enable or disable this feature later in the 'Simulation Settings' > 'Behavior' panel.

Enable Undo/Redo Operations



Finish

Cancel

# Entorno del software

The screenshot displays the DWSIM software interface. At the top, the title bar reads "DWSIM - [MySimulation\_38]". The menu bar includes: File, Edit, Insert, Tools, Dynamics, Utilities, Flowsheet, Analysis, Results, Plugins, Spreadsheet, Windows, View, Help. The ribbon contains tabs for: Files, Flowsheet, Dynamics Manager, Material Streams, Spreadsheet, Charts, Script Manager. Below the ribbon is a "Control Panel Mode" search bar and a toolbar with icons for Heatmap Layers, Live Flow, T1 Set Global Font Size (10), Set Font Styles..., Color Theme, Color Icons, and Auto-Connect Added Objects (Smart). On the right side, the "Object Palette" is open, showing a "Streams" section with "Material Stream" (blue arrow) and "Energy Stream" (red arrow). Below this are categories: Pressure Changers, Separators/Tanks, Mixers/Splitters, Exchangers, Reactors, Columns, Solids, Renewable Energies, User Models, FOSSEE Custom Models, Logical Blocks, Indicators, Controllers, and Other. At the bottom, there is an "Information" panel with columns for Date, Type, and Message. Below that is a "Messages" section with a "View All" button. The footer contains a donation message: "Support continuous development and maintenance of DWSIM for as low as 3 USD per month or with a one-time donation." and a "Quick Question" button. The status "Anonymous Analytics Sharing is ON" is also visible.

# Entorno del software

The screenshot displays the DWSIM software interface. At the top, the window title is "DWSIM - [MySimulation\_38]". The menu bar includes File, Edit, Insert, Tools, Dynamics, Utilities, Flowsheet Analysis, Results, Plugins, Spreadsheet, Windows, View, and Help. The toolbar contains icons for Translate (Spanish), Settings, Solve, Abort, Dynamics, and Flowsheet States. Below the toolbar, the main workspace shows a central area with a grid of icons for Flowsheet Analysis, Results, Plugins, and Spreadsheet. A "Material Streams" and "Spreadsheet" section is visible. On the right side, the "Object Palette" is open, showing a list of components: Streams (Material Stream, Energy Stream), Pressure Changers, Separators/Tanks, Mixers/Splitters, Exchangers, Reactors, Columns, Solids, Renewable Energies, User Models, FOSSE Custom Models, Logical Blocks, Indicators, Controllers, and Other. At the bottom, there is an "Information" panel with columns for Date, Type, and Message. Below this, there is a "Messages" section and a footer with a donation message: "Support continuous development and maintenance of DWSIM for as low as 3 USD per month or with a one-time donation." and a "Quick Question" button.

# Listado de objetos disponibles para agregar al flowsheet



## Streams



Material Stream



Energy Stream



## Pressure Changers



Orifice Plate



Compressor



Pipe Segment



Pump



Expander (Turbine)



Valve



Pipe Network Unit Operation



Pipe Network



## Separators/Tanks



Compound Separator



Tank



Gas-Liquid Separator



## Mixers/Splitters



Stream Mixer



Stream Splitter



Energy Mixer



Energy Stream Splitter



## Exchangers



Cooler



Heater



Heat Exchanger



Air Cooler 2



Falling Film Evaporator



## Reactors



Conversion Reactor



Continuous Stirred Tank Reactor (CSTR)



Equilibrium Reactor



Gibbs Reactor



Plug-Flow Reactor (PFR)



Gibbs Reactor (Reaktoro)



## Columns



ChemSep Column



Distillation Column



Absorption/Extraction Column



Shortcut Column



Three-Phase/Reactive Column (Pro)



PPBDesigner Column

# Listado de objetos disponibles para agregar al flowsheet

## Solids



Filter



Solids Separator

## Renewable Energies



Hydroelectric Turbine



PEM Fuel Cell (Amphlett)



Solar Panel



Water Electrolyzer



Wind Turbine

## User Models



Python Script



Flowsheet



CAPE-OPEN Unit Operation



Spreadsheet



Neural Network Unit Operation



Neural Network (Pro)

## FOSSEE Custom Models



Cross Flow Tray Dryer



Cyclone Separator



Electrostatic Precipitator



Helical Coil Heat Exchanger



Humidifier



Isothermal Batch Reactor



Packed Distillation Column



Plate Heat Exchanger



Stoichiometric Reactor

## Logical Blocks



Input Box



Switch



Controller Block



Energy Recycle Block



Recycle Block



Specification Block



Material Stream Switch



Energy Stream Switch

## Indicators



Analog Gauge



Digital Gauge



Level Gauge

# Listado de objetos disponibles para agregar al flowsheet



## Controllers



**PID Controller**



**Python Controller**



## Other



**Dummy Unit  
Operation**



# Material Stream



## Material Stream

- Es uno de los módulos de cálculo más importantes ya que se utiliza para representar el ingreso y egreso de materia a un proceso, así como también la interconexión de equipos dentro del mismo.
- Para poder ejecutarse requiere la siguiente información (inputs):
  - Composición global de la mezcla (base molar, másica o volumétrica).
  - Dos propiedades intensivas (por ejemplo, Presión y Temperatura).
  - Una magnitud de flujo de materia (base molar, másica o volumétrica).

## Material Stream. Secuencia de resolución

Secuencia de cálculo realizada por el módulo Material Stream:

1. Realiza la estimación del estado de agregación de la mezcla, identificando la presencia de fase líquida, vapor o mezcla de ambas (FLASH problem).
2. Calcula de manera individual las propiedades de la/s fase/s.
3. Calcula las propiedades globales de la corriente (si existe una única fase las propiedades son idénticas a las del paso 2).

## Material Stream. Información de salida (outputs)

Se calculan las siguientes propiedades:

1. Distribución de los componentes entre las fases.
2. Propiedades de cada fase (entalpía, entropía, peso molecular, densidad, etc).
3. Calcula las propiedades globales de la corriente (entalpía, entropía, peso molecular, densidad, etc).

## Ejercicio de aprendizaje propuesto

Dada de la corriente de gas cuyo Flujo es de 100 kg/h, y de composición:

C1	C2	C3
0.6	0.2	0.2

- Utilizar el paquete termodinámico Peng-Robinson.
- Ajuste una presión de **7500 kPa** y una temperatura de **10° C**. ¿Cuál es la fracción de vapor?
- Realice el cálculo de **punto de rocío** a esta corriente. Fije una presión de **7500 kPa**. ¿Cual es la temperatura de rocío?

# Selección de los compuesto intervinientes

← Simulation Configuration Wizard

## Compounds

- ✓ Introduction
- ▶ **Compounds**
- ▶ Property Packages
- ▶ System of Units
- ▶ Behavior
- ▶ Undo/Redo

En lo posible utilizar la  
misma base de datos  
(ChemSep en este ejemplo)

Select the compounds that you want to add to the simulation. Use the textbox to search and select a compound in the list. Click "Next" to continue.

Added	Name	CAS Number	Formula	Source Database	CP
<input checked="" type="checkbox"/>	Methane	74-82-8	CH4	ChemSep	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	Ethane	74-84-0	CH3CH3	ChemSep	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	Propane	74-98-6	CH3CH2CH3	ChemSep	<input checked="" type="checkbox"/>
<input type="checkbox"/>	N-butane	106-97-8	CH3(CH2)2CH3	ChemSep	<input checked="" type="checkbox"/>
<input type="checkbox"/>	N-pentane	109-66-0	CH3(CH2)3CH3	ChemSep	<input checked="" type="checkbox"/>
<input type="checkbox"/>	N-hexane	110-54-3	CH3(CH2)4CH3	ChemSep	<input checked="" type="checkbox"/>
<input type="checkbox"/>	N-heptane	142-82-5	CH3(CH2)5CH3	ChemSep	<input checked="" type="checkbox"/>
<input type="checkbox"/>	N-octane	111-65-9	CH3(CH2)6CH3	ChemSep	<input checked="" type="checkbox"/>
<input type="checkbox"/>	N-nonane	111-84-2	CH3(CH2)7CH3	ChemSep	<input checked="" type="checkbox"/>
<input type="checkbox"/>	N-decane	124-18-5	CH3(CH2)8CH3	ChemSep	<input checked="" type="checkbox"/>
<input type="checkbox"/>	N-undecane	1120-21-4	CH3(CH2)9CH3	ChemSep	<input checked="" type="checkbox"/>
<input type="checkbox"/>	N-dodecane	112-30-2	CH3(CH2)10CH3	ChemSep	<input checked="" type="checkbox"/>

Search



Add from Other Sources >



View Selected


Added Compounds

Methane, Ethane, Propane

Next >

Cancel

# Selección del paquete fisicoquímico

←  Simulation Configuration Wizard











## Property Packages

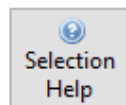
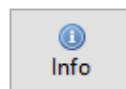
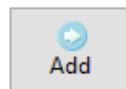
- ✓ Introduction
- ✓ Compounds
- ▶ **Property Packages**
- ▶ System of Units
- ▶ Behavior
- ▶ Undo/Redo

Select and Add the Property Packages that you want to use in your simulation. The first on the list will be used by default by all flowsheet objects. Click "Next" to continue.

### Available Property Packages

Filter By: Most Popular

<input checked="" type="checkbox"/>		Peng-Robinson (PR)
<input checked="" type="checkbox"/>		Soave-Redlich-Kwong (SRK)
<input checked="" type="checkbox"/>		Soave-Redlich-Kwong (SRK) Advanced
<input checked="" type="checkbox"/>		CoolProp
<input checked="" type="checkbox"/>		Extended CoolProp
<input checked="" type="checkbox"/>		Raoult's Law
<input checked="" type="checkbox"/>		Peng-Robinson-Stryjek-Vera 2 (PRSV2-VL)
<input checked="" type="checkbox"/>		ThermoC Bridge
<input checked="" type="checkbox"/>		Peng-Robinson 1978 (PR78) for Petroleum Indu
<input checked="" type="checkbox"/>		REFPROP



### Added Property Packages

Name	Type
------	------

Recommended packages are marked with a , but you can use all available packages without restrictions.

Override Phase Equilibria calculation settings?  Leave as default (SVLLE)  VLE (faster)  VLLE/LLE  Do not calculate

Next >

Cancel

# Selección del paquete fisicoquímico

← Simulation Configuration Wizard

## Property Packages

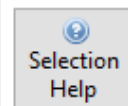
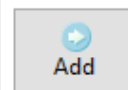
- ✓ Introduction
- ✓ Compounds
- ▶ **Property Packages**
- ▶ System of Units
- ▶ Behavior
- ▶ Undo/Redo

Select and Add the Property Packages that you want to use in your simulation. The first on the list will be used by default by all flowsheet objects. Click "Next" to continue.

Available Property Packages

Filter By: Most Popular

- ✓ Peng-Robinson (PR)
- ✓ Soave-Redlich-Kwong (SRK)
- ✓ Soave-Redlich-Kwong (SRK) Advanced
- ✓ CoolProp
- ✓ Extended CoolProp
- ✓ Raoult's Law
- ✓ Peng-Robinson-Stryjek-Vera 2 (PRSV2-VL)
- ✓ ThermoC Bridge
- ✓ Peng-Robinson 1978 (PR78) for Petroleum Indu
- ✓ REFPROP



Added Property Packages

Name	Type
Peng-Robinson...	Peng-Robinson (PR)

Recommended packages are marked with a ✓, but you can use all available packages without restrictions.

Override Phase Equilibria calculation settings?  Leave as default (SVLLE)  VLE (faster)  VLLE/LLE  Do not calculate

Next >

Cancel

# Selección del paquete fisicoquímico

Configure Property Package (Peng-Robinson (PR) (1)) [Peng-Robinson (PR)]

Model Parameters Equilibrium Calculation Settings Property Calculation Settings Forced Solids Property Overrides

Binary Interaction Parameters


Model Parameters: PR EOS kij

	Methane	Ethane	Propane
Methane		-0.0033	0.0119
Ethane	-0.0033		0.0011
Propane	0.0119	0.0011	

Estimate



# Unidades

←  Simulation Configuration Wizard

## System of Units

- ✓ Introduction
- ✓ Compounds
- ✓ Property Packages
- ▶ **System of Units**
- ▶ Behavior
- ▶ Undo/Redo

Select the desired System of Units for your simulation. You can change individual units by selecting a custom system (other than SI, CGS or ENG).

Click "Finish" to exit the wizard and start designing the simulation model.

System of Units

Property	Unit	Property	Unit
Temperature	K	Pressure	Pa
Mass Flow Rate	kg/s	Molar Flow Rate	mol/s
Volumetric flow rate	m <sup>3</sup> /s	Specific Enthalpy	kJ/kg
Specific Entropy	kJ/[kg.K]	Molecular Weight	kg/kmol
Density	kg/m <sup>3</sup>	Surface Tension	N/m
Heat Capacity	kJ/[kg.K]	Thermal Conductivity	W/[m.K]
Kinematic Viscosity	m <sup>2</sup> /s	Dynamic Viscosity	Pa.s
Temperature Difference	K.	Pressure Difference	Pa
Length/Head	m	Energy Flow	kW
Time	s	Volume	m <sup>3</sup>
Molar Volume	m <sup>3</sup> /kmol	Area	m <sup>2</sup>
Diameter/Thickness	mm	Force	N

Next >

Cancel

# Comienzo de la simulación

The screenshot displays the DWSIM software interface. The main window title is "DWSIM - [Intro (C:\Users\jmanassald\Documents\Manassald\Integracion IV\DWSIM\Intro.dwxmz)]". The menu bar includes File, Edit, Insert, Tools, Dynamics, Utilities, Flowsheet, Analysis, Results, Plugins, Spreadsheet, Windows, View, and Help. The toolbar contains icons for various functions like Solve, Abort, and Dynamics. The main workspace is currently empty, with a red arrow pointing to a small red arrow icon labeled "1". A red circle highlights the "Material Stream" icon in the "Object Palette" on the right. A red arrow points from this icon to the workspace, with the text "Drag & Drop" written in red. The "Object Palette" lists various components under the "Streams" category, including Material Stream and Energy Stream, and other categories like Pressure Changers, Separators/Tanks, Mixers/Splitters, Exchangers, Reactors, Columns, Solids, Renewable Energies, User Models, FOSSEE Custom Models, Logical Blocks, Indicators, Controllers, and Other. The status bar at the bottom shows a message: "Messages [26/06/2023 10:25:31] File C:\Users\jmanassald\Documents\Manassald\Integracion IV\DWSIM\Intro.dwxmz saved successfully." and a "View All" button. There are also links for "Support continuous development and maintenance of DWSIM for as low as 3 USD per month or with a one-time donation.", "One-Time Donation", "Monthly Donation", "Quick Question", and "Anonymous Analytics Sharing is ON".

# Modulo "Material Stream" (corriente de materia)

1 (Material Stream) [icon] [x]

Information Connections

General Info

Object 1 [icon]

Status Not Calculated [icon]

Linked to

Property Package Settings **Datos de la corriente**

Property Package Peng-Robinson (PR) (1) [icon]

Input Data Results Annotations Dynamics Floating Tables

Stream Conditions Compound Amounts

Flash Spec Temperature and Pressure (TP) [v]

Temperature 298.15 K [v]

Pressure 101325 Pa [v]

Mass Flow 1 kg/s [v]

Molar Flow 0 mol/s [v]

Volumetric Flow 0 m3/s [v]

Specific Enthalpy 0 kJ/kg [v]

Specific Entropy 0 kJ/[kg.K] [v]

Vapor Phase Mole Fraction 0

Force Stream Phase Global Definition [v]

Do not change this setting unless you know what you're doing.

Al agregar una corriente sus datos se completan con valores por defecto



# Propiedades de las corrientes de materia

1 (Material Stream) [Close]

Information Connections

General Info

Object: 1

Status: Not Calculated

Linked to:

Property Package Settings

Property Package: Peng-Robinson (PR) (1)

Input Data Results Annotations Dynamics Floating Tables

Stream Conditions Compound Amounts

Flash Spec: Temperature and Pressure (TP)

Temperature: 298.15 K

Pressure: 101325 Pa

Mass Flow: 1 kg/s

Molar Flow: 0 mol/s

Volumetric Flow: 0 m3/s

Specific Enthalpy: 0 kJ/kg

Specific Entropy: 0 kJ/[kg.K]

Vapor Phase Mole Fraction: 0

Force Stream Phase: Global Definition

Do not change this setting unless you know what you're doing.

Se puede cambiar el nombre de la corriente

Input Data Results Annotations Dynamics Floating Tables

Stream Conditions Compound Amounts

Basis: Mole Fractions

Solvent:

Compound	Amount
Methane	0.33333333
Ethane	0.33333333
Propane	0.33333333

Buttons: Normalize, Equalize, Clear, Complete, Accept

# Propiedades de las corrientes de materia

Es conveniente comenzar definiendo la composición de la corriente.  
Por defecto es una mezcla equimolar de todos los compuestos.

Input Data Results Annotations Dynamics Floating Tables

Stream Conditions Compound Amounts

Basis Mole Fractions

Solvent

Compound	Amount
Methane	0.6
Ethane	0.2
Propane	0.2

Normalize

Equalize

Clear

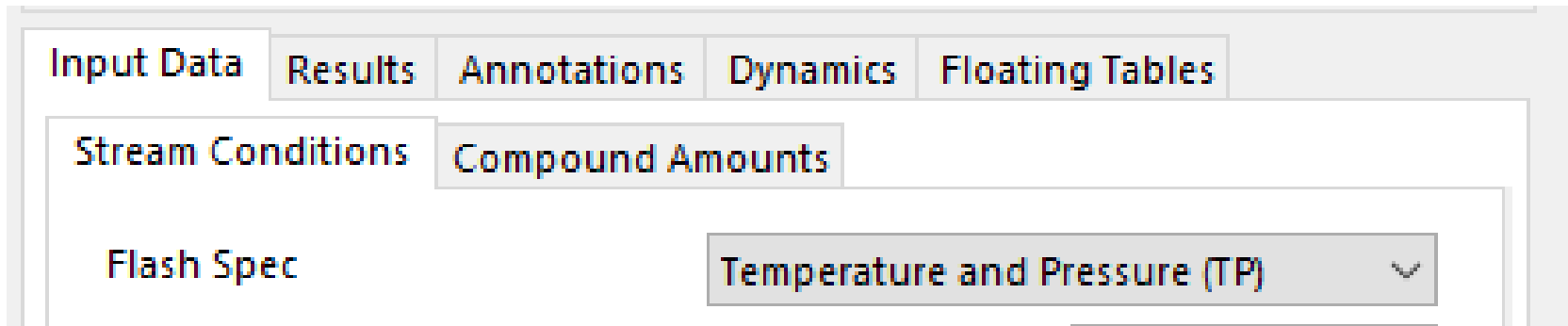
Complete

Accept

Se ingresa la composición y se aceptan los cambios

# Propiedades de las corrientes de materia


## FLASH Spec (Especificaciones para el calculo del flash)



# Propiedades de las corrientes de materia

## FLASH Spec

(Especificaciones para el calculo del flash)

Temperature and Pressure (TP) 

Temperature and Pressure (TP)

Pressure and Enthalpy (PH)

Pressure and Entropy (PS)

Pressure and Vapor Fraction (PVF)

Temperature and Vapor Fraction (TVF)

# Resolución del ejercicio propuesto

Ajuste una presión de **7500 kPa** y una temperatura de **10° C**  
¿Cuál es la fracción de vapor?

Input Data Results Annotations Dynamics Floating Tables

Stream Conditions Compound Amounts

Flash Spec

Temperature	298.15	K	7500	Pa
Pressure	101325	Pa		
Mass Flow	1	kg/s		
Molar Flow	40.8857	mol/s		
Volumetric Flow	0.995099	m3/s		
Specific Enthalpy	-1.58673	kJ/kg		
Specific Entropy	0.305015	kJ/[kg.K]		
Vapor Phase Mole Fraction	1			

Temperature units: K, R, C, F

Pressure units: Pa, atm, kgf/cm2, kgf/cm2g, lbf/ft2, kPa, kPag, bar, barg, ftH2O, inH2O, inHg, mbar, mH2O, mmH2O, mmHg, MPa, psi, psig



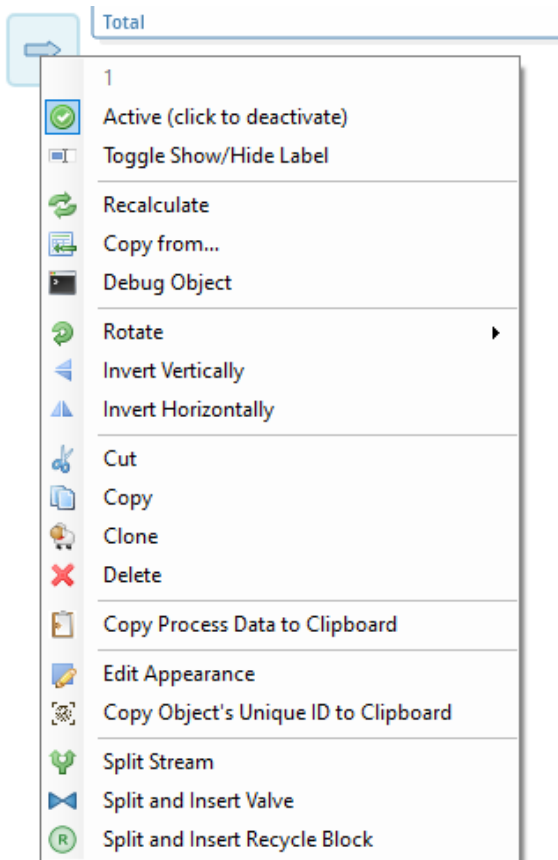
## Resolución del ejercicio propuesto

Ajuste una presión de **7500 kPa** y una temperatura de **10° C**  
¿Cuál es la fracción de vapor?

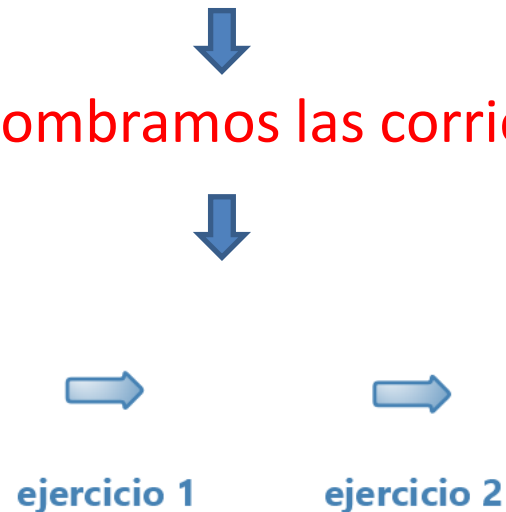
Input Data	Results	Annotations	Dynamics	Floating Tables
Stream Conditions		Compound Amounts		
Flash Spec	Temperature and Pressure (TP) ▾			
Temperature	283.15	K	▾	
Pressure	7.5E+06	Pa	▾	
Mass Flow	1	kg/s	▾	
Molar Flow	40.8857	mol/s	▾	
Volumetric Flow	0.00582125	m <sup>3</sup> /s	▾	
Specific Enthalpy	-236.992	kJ/kg	▾	
Specific Entropy	-1.81419	kJ/[kg.K]	▾	
Vapor Phase Mole Fraction	0.746024			

# Resolución del ejercicio propuesto

Clonamos la corriente  
para no volver a  
definir la composición



Renombramos las corrientes



## Resolución del ejercicio propuesto

Realice el cálculo de punto de rocío a esta corriente. Fije una presión de 7500 kPa  
¿Cual es la temperatura de rocío?

The screenshot shows a software interface with the following elements:

- Input Data** tab selected.
- Stream Condition** dropdown menu open, showing options: Temperature and Pressure (TP), Temperature and Pressure (TP), Pressure and Enthalpy (PH), Pressure and Entropy (PS), **Pressure and Vapor Fraction (PVF)** (highlighted with a red box), and Temperature and Vapor Fraction (TVF).
- Volumetric Flow**: 0.00582125 m<sup>3</sup>/s
- Specific Enthalpy**: -236.992 kJ/kg
- Specific Entropy**: -1.81419 kJ/[kg.K]
- Vapor Phase Mole Fraction**: 0.746024

# Resolución del ejercicio propuesto

Realice el cálculo de punto de rocío a esta corriente. Fije una presión de 7500 kPa  
¿Cual es la temperatura de rocío?

Input Data

Results

Annotations

Dynamics

Floating Tables

Stream Conditions

Compound Amounts

Flash Spec

Pressure and Vapor Fraction (PVF) 

Temperature

293.104

K



Pressure

7.5E+06

Pa



Mass Flow

1

kg/s



Molar Flow

40.8857

mol/s



Volumetric Flow

0.00744895

m<sup>3</sup>/s



Specific Enthalpy

-177.453

kJ/kg



Specific Entropy

-1.61086

kJ/[kg.K]



Vapor Phase Mole Fraction

1

# Diagramas de equilibrio líquido-vapor para mezclas binarias

Pasos:

1. Crear un nuevo caso de simulación definiendo los compuestos intervinientes y los paquetes termodinámicos que se desean comparar.
2. En el flowsheet crear una nueva corriente de materia.

Ejemplo:

Metanol (1) y Agua(2) usando NRTL y Ley de Raoult.

Added	Name
<input checked="" type="checkbox"/>	Methanol
<input checked="" type="checkbox"/>	Water



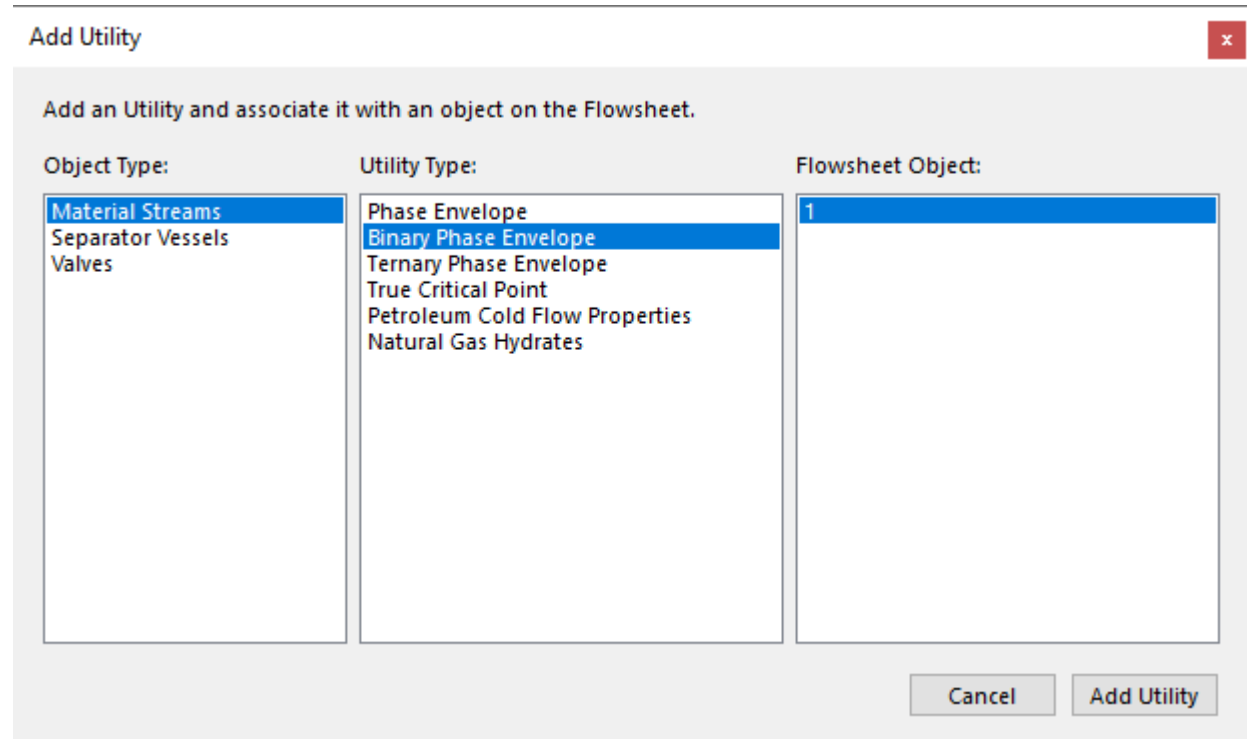
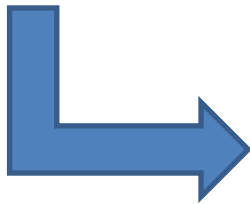
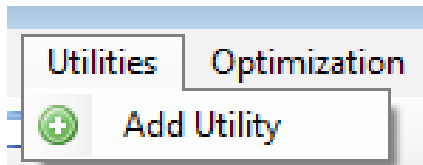
Name	Type	
Raoult's Law (1)	Raoult's Law	...
NRTL (2)	NRTL	...

# Diagramas de equilibrio líquido-vapor para mezclas binarias

3. Seleccionar la corriente de materia creada y agregar una “utility”.

4. Seleccionar las siguientes opciones:

Material Stream > Binary Phase Envelope > MSTR-000 (nombre de la corriente creada)



# Diagramas de equilibrio líquido-vapor para mezclas binarias

5. En la ventana principal se deben seleccionar las opciones del diagrama

The screenshot displays a software window titled "BinaryEnvelope1" with a docking bar at the top containing tabs for Files, Flowsheet, Dynamics Manager, Material Streams, Spreadsheet, Charts, Script Manager, GHG Emissions, Costing, and BinaryEnvelope1. The main interface is divided into a settings panel on the left and a results panel on the right.

**Diagram Settings:**

- Compound 1: Methanol
- Compound 2: Water
- Envelope type:  Txy,  Pxy,  (T)xy,  (P)xy
- Txy Diagram Options:  VLE,  LLE,  SLE,  Eutectic,  Solid Solution,  Critical Line
- X Axis Basis: Mole Fraction
- Pressure: 101325 Pa
- Temperature: 298.15 K
- Fraction Range: Min 0, Max 1
- Stepcount: 40
- Property Package: Raoult's Law (1) (Raoult's Law)
- Compare Models
- Calculate button

**Results Panel:**

- Graph, Exp. Data, Table tabs
- Graph titled "Title" with X and Y axes ranging from 0.0 to 1.2.
- Open Panel and View History buttons at the bottom right.

# Diagramas de equilibrio líquido-vapor para mezclas binarias

## Diagrama $T$ vs $x/y$ a 1 atm utilizando NRTL

Diagram Settings

Compound 1

Compound 2

Envelope type  Txy  Pxy  (T)xy  (P)xy

Txy Diagram Options  VLE  LLE

SLE  Eutectic  Solid Solution

Critical Line

X Axis Basis

Pressure  Pa

Temperature  K

Fraction Range Min  Max

Stepcount

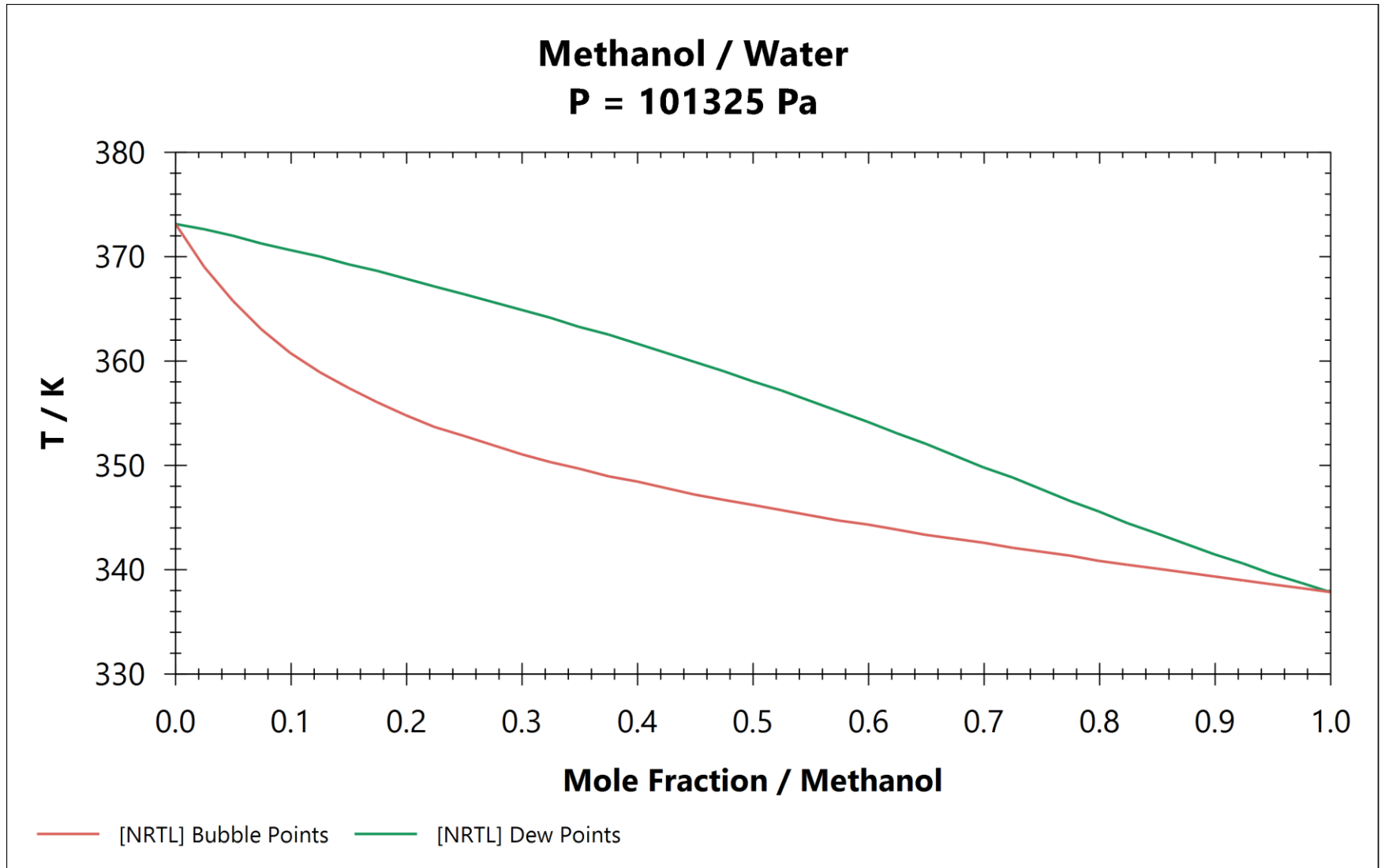
Property Package

Compare Models



# Diagramas de equilibrio líquido-vapor para mezclas binarias

Diagrama  $T$  vs  $x/y$  a 1 atm utilizando NRTL



# Diagramas de equilibrio líquido-vapor para mezclas binarias

## Diagrama $y$ vs $x$ a 1 atm utilizando NRTL

Diagram Settings

Compound 1

Compound 2

Envelope type  Txy  Pxy  (T)xy  (P)xy

Txy Diagram Options  VLE  LLE

SLE  Eutectic  Solid Solution

Critical Line

X Axis Basis

Pressure  Pa

Temperature  K

Fraction Range Min  Max

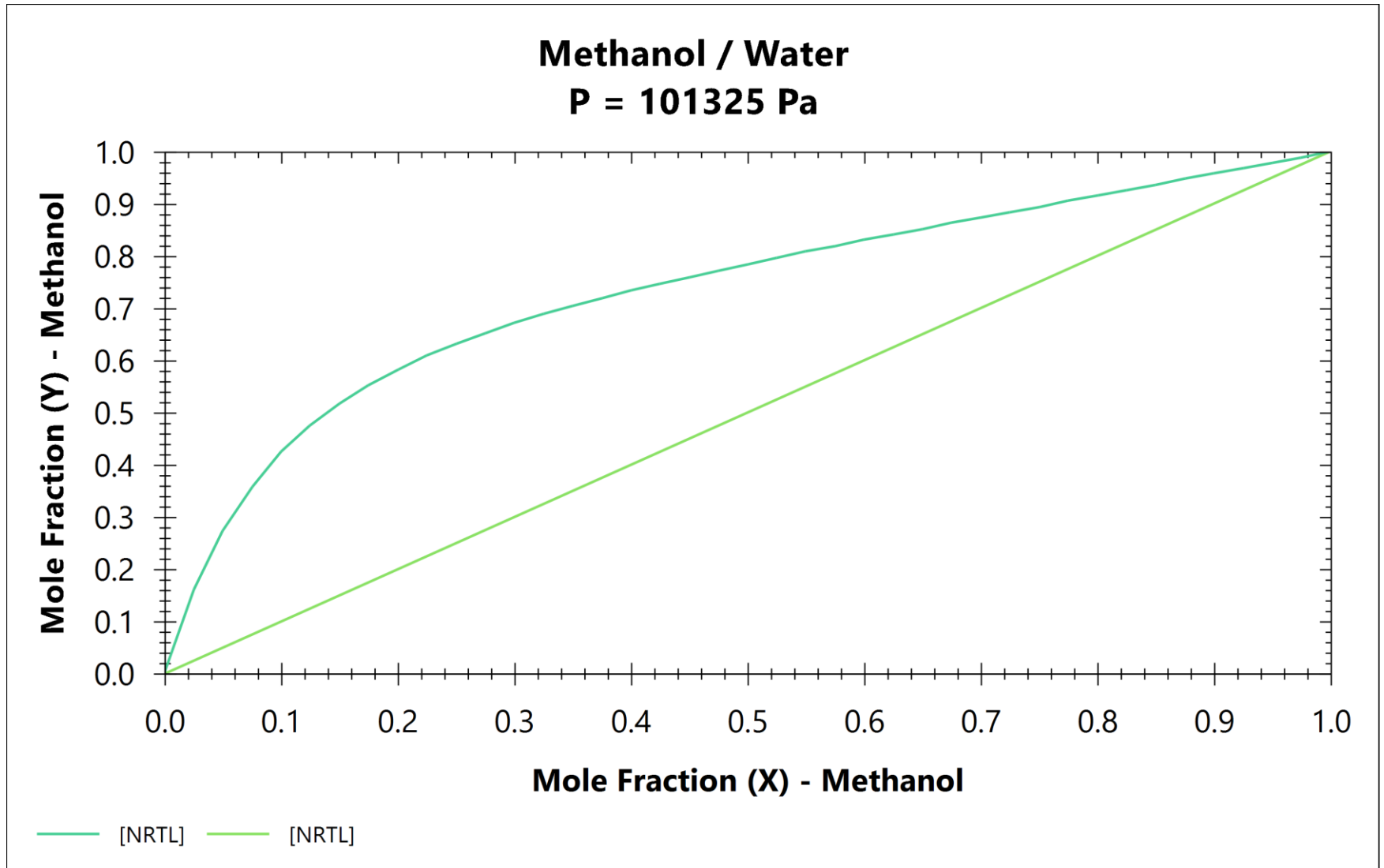
Stepcount

Property Package

Compare Models

# Diagramas de equilibrio líquido-vapor para mezclas binarias

Diagrama  $y$  vs  $x$  a 1 atm utilizando NRTL



# Diagramas de equilibrio líquido-vapor para mezclas binarias

Diagramas  $T$  vs  $x/y$  a 1 atm comparando los modelos fisicoquímicos.

Diagram Settings

Compound 1

Compound 2

Envelope type  Txy  Pxy  (T)xy  (P)xy

Txy Diagram Options  VLE  LLE

SLE  Eutectic  Solid Solution

Critical Line

X Axis Basis

Pressure  Pa

Temperature  K

Fraction Range Min  Max

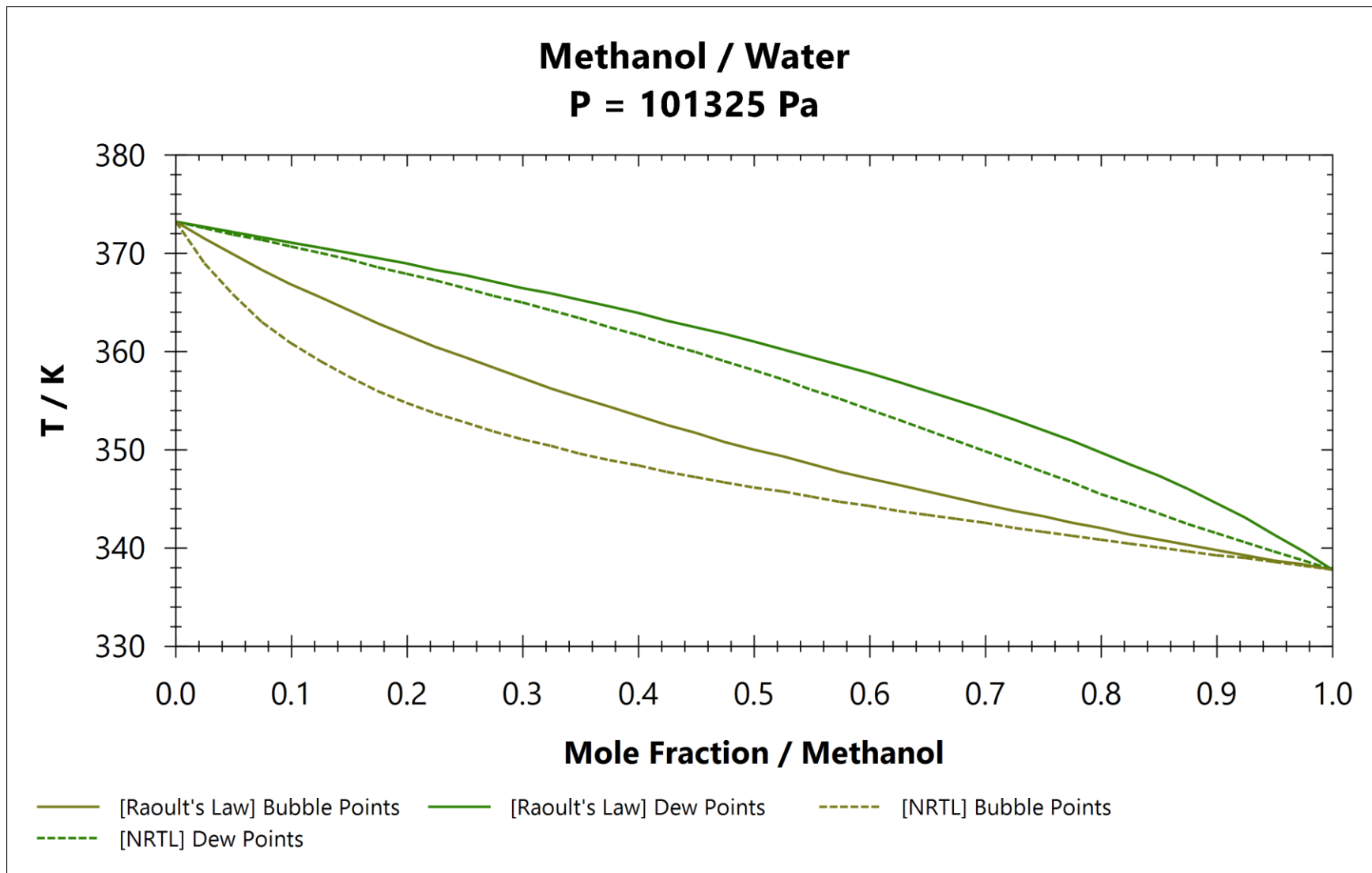
Stepcount

Property Package

Compare Models

# Diagramas de equilibrio líquido-vapor para mezclas binarias

Diagramas  $T$  vs  $x/y$  a 1 atm comparando los modelos fisicoquímicos.



# Diagramas de equilibrio líquido-vapor para mezclas binarias

Diagramas  $y$  vs  $x$  a 1 atm comparando los modelos fisicoquímicos.

Diagram Settings

Compound 1

Compound 2

Envelope type  Txy  Pxy  (T)xy  (P)xy

Txy Diagram Options  VLE  LLE

SLE  Eutectic  Solid Solution

Critical Line

X Axis Basis

Pressure  Pa

Temperature  K

Fraction Range Min  Max

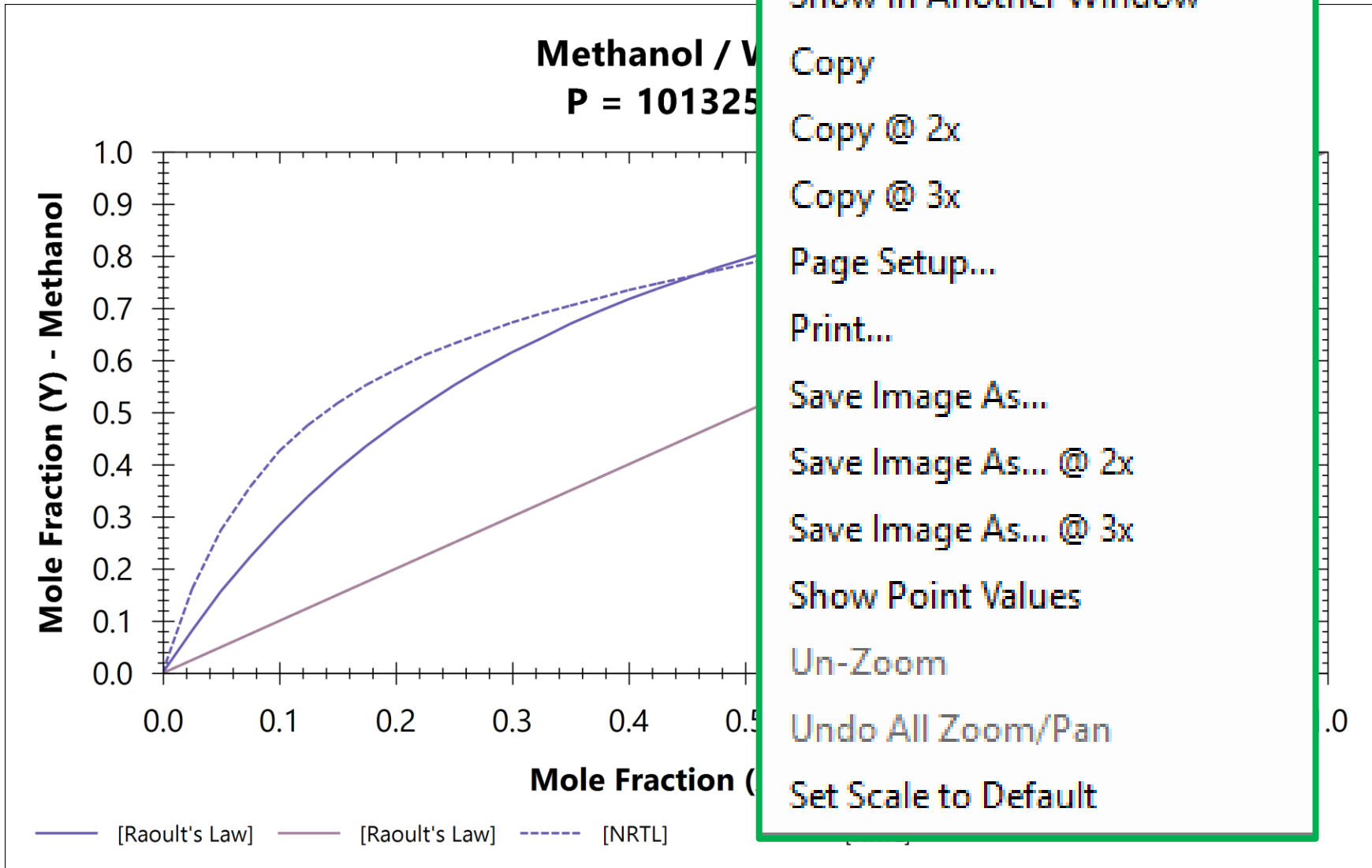
Stepcount

Property Package

Compare Models

# Diagramas de equilibrio líquido-vapor para mezclas binarias

Diagramas y vs x a 1 atm comparando los



# Diagramas de equilibrio líquido-vapor para mezclas binarias

## Inclusión de datos experimentales

Results

Graph **Exp. Data** Table

	x1 (Molar Fraction)	y1 (Molar Fraction)	T (K)	P (Pa)
<input type="checkbox"/>				

Results

Graph **Exp. Data** Table

	x1 (Molar Fraction)	y1 (Molar Fraction)	T (K)	P (Pa)
<input checked="" type="checkbox"/>	0.04780	0.25590	312.91	9079
<input checked="" type="checkbox"/>	0.09250	0.45620	312.91	11412
<input checked="" type="checkbox"/>	0.13350	0.6214	312.91	13012
<input checked="" type="checkbox"/>	0.3065	0.76120	312.91	19025
<input type="checkbox"/>				



# Diagramas de equilibrio líquido-vapor para mezclas binarias

## Inclusión de datos experimentales

Diagram Settings

Compound 1

Compound 2

Envelope type  Txy  Pxy  (T)xy  (P)xy

Txy Diagram Options  VLE  LLE

SLE  Eutectic  Solid Solution

Critical Line

X Axis Basis

Pressure  Pa

Temperature  K

Fraction Range Min  Max

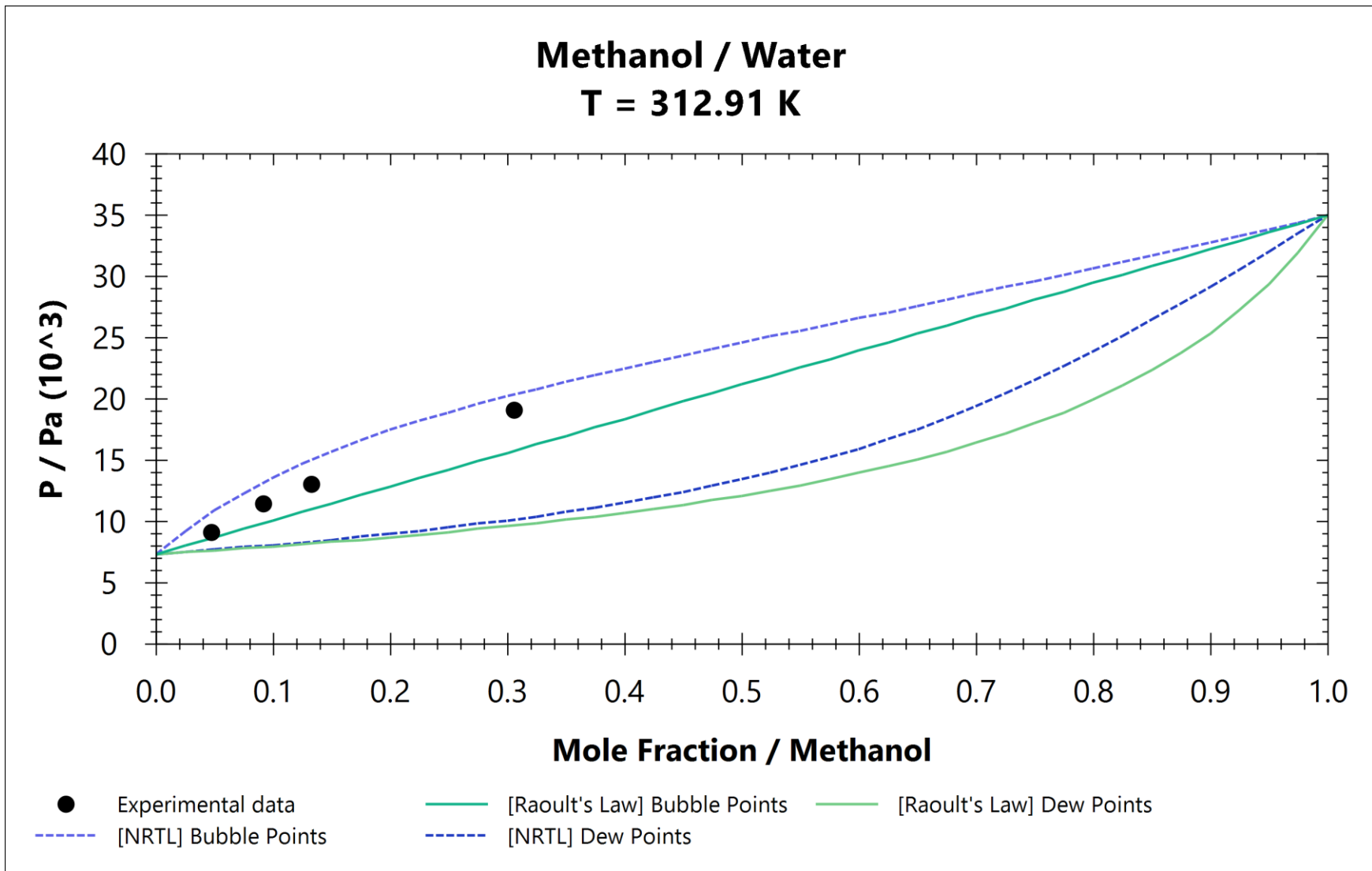
Stepcount

Property Package

Compare Models

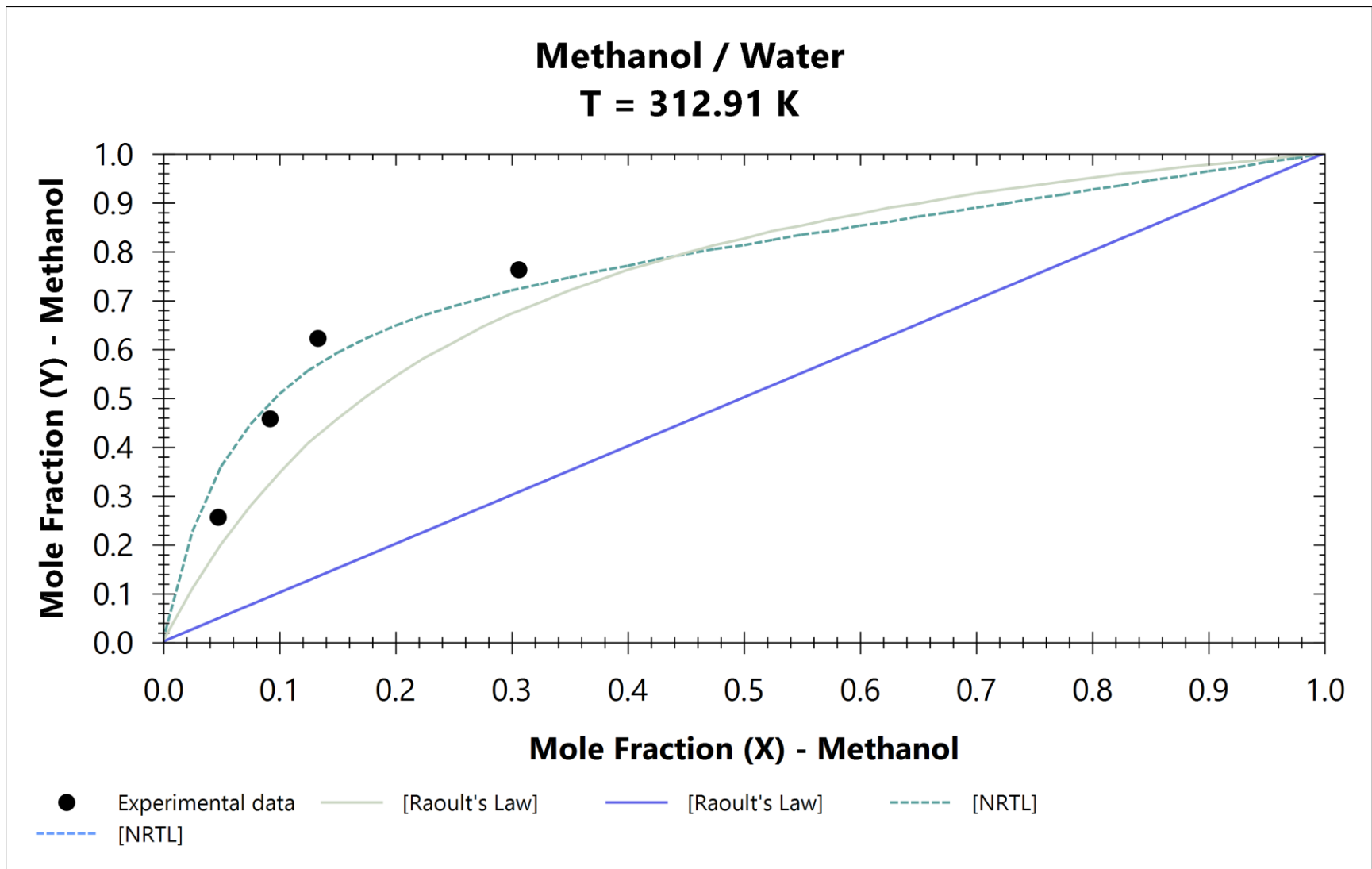
# Diagramas de equilibrio líquido-vapor para mezclas binarias

Diagramas  $P$  vs  $x/y$  a 312.91 K comparando NRTL, RL y datos experimentales



# Diagramas de equilibrio líquido-vapor para mezclas binarias

Diagramas  $y$  vs  $x$  a 312.91 K comparando NRTL, RL y datos experimentales



# Diagramas de equilibrio líquido-vapor para mezclas binarias

Diagramas  $y$  vs  $x$  a 312.91 K comparando NRTL, RL y datos experimentales

