Sensitivity Analysis, Adjust

Spoken Tutorial Project
http://spoken-tutorial.org

National Mission on Education through ICT
http://sakshat.ac.in

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We will

- **determine the exact Reflux Ratio for a separation**

Learning Objectives

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- **repeat this through the Adjust operation**

System Requirements

- **DWSIM 3.4**
- **Any OS: Windows, Linux, Mac OS X or FOSSEE OS on ARM**

Prerequisites

To practice this tutorial you should know

- **How to open a simulation file in DWSIM**

- **How to carry out rigorous distillation simulation**

- **How to add components to a flowsheet**

Prerequisite Tutorials and Files

- **http://spoken-tutorial.org gives details of prerequisite tutorials**

- **The prerequisite tutorials are available at this website**

- **All associated files are also available at this site**

Problem Solved in a Prerequisite Tutorial: rigorous.dwxml

- **Components: Benzene, Toluene**
- **Reflux ratio: 2**
- **Benzene mole fraction desired in distillate = 0.95**
- **Achieved mole fraction = 0.946**

Problem Solved in a Prerequisite Tutorial: rigorous.dwxml

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- **Reflux ratio: 2**
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- **How do we improve the purity?**

Problem Solved in a Prerequisite Tutorial: rigorous.dwxml

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- **Reflux ratio: 2**
- **Benzene mole fraction desired in distillate = 0.95**
- **Achieved mole fraction = 0.946**
- **How do we improve the purity?**
- **Increase the reflux ratio**

Assignment 1: Determine the exact reflux ratio

- Can you find out the reflux ratio required for 0.95 purity?
- Follow the procedure I explained just now
- It is approximately 2.067

Assignment 2: Two Dependent Variables

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- **Find out how to plot two profiles using Chart**

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- **Change the reflux ratio to 2.067**

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- **Simulate**

Assignment 3: Validation of Results of Sensitivity Analysis

- **Verify if the reflux ratio of 2.067 that we saw in assignment 1 will work**
- **For this, start with rigorous.dwxml once again**
- **Change the reflux ratio to 2.067**
- **Simulate**
- **What distillate composition do you get?**

- **Supposing that I want 0.96 benzene mole fraction in the distillate**

Assignment 4: Higher Purity

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- **What reflux ratio is required?**
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- **Solve this first by Sensitivity Analysis**

Assignment 4: Higher Purity

- **Supposing that I want 0.96 benzene mole fraction in the distillate**
- **What reflux ratio is required?**
- **As in the problems we solved, you may change only the reflux ratio**
- **Solve this first by Sensitivity Analysis**
- **Check your calculations with Adjust**

- **Find the highest distillate purity you can get in this column**

Assignment 5: Highest Purity

- **Find the highest distillate purity you can get in this column**
- **You may vary the reflux ratio only, as in the earlier assignments**
- **I could go up to a mole fraction of 0.99, by proceeding gradually**

Summary

We learnt the following in this tutorial:

- **How to do Sensitivity Analysis?**
- **How to narrow the solution range?**
- **How to directly achieve the same results using Adjust?**
- **How to use Adjust to push a plant to deliver more?**

Rahul, Neelesh, Kannan   DWSIM Simulation

About the Spoken Tutorial Project

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- If you do not have good bandwidth, you can download and watch it

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- **Do you have questions in THIS Spoken Tutorial?**
- **Choose the minute and second where you have the question.**
- **Explain your question briefly.**
- **Someone from the FOSSEE team will answer them.**

Please visit http://forums.spoken-tutorial.org/

Textbook Companion Project

- **The FOSSEE team coordinates coding of solved examples of popular books**
- **We give honorarium and certificate to those who do this**

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http://dwsim.fossee.in/Textbook_Companion_Project

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- **The FOSSEE team helps migrate commercial simulator labs to DWSIM**
- **We give honorarium and certificates to those who do this**

For more details, please visit this site:

http://dwsim.fossee.in/lab-migration-project

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- **More information on this mission is available at**

    http://spoken-tutorial.org/NMEICT-Intro

Thanks!

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