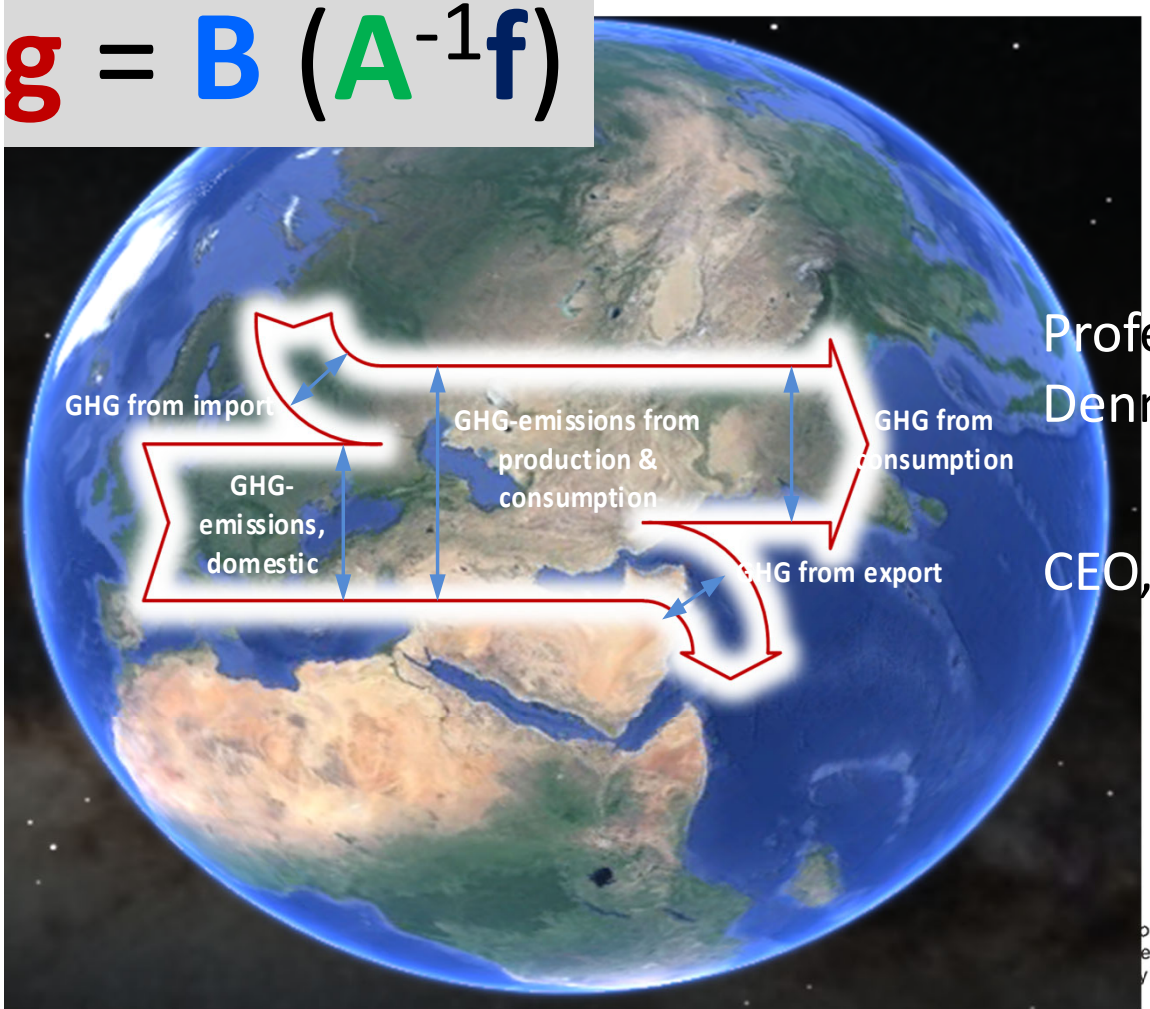
Input-output modelling

Online interactions and Q&A on video lectures 6-10

$$g = B\,(A^{-1}f)$$



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Agenda

- Interaction and QA on video lectures
- Homework from last session: wrap-up
- Exercise: Hybrid LCA in SimaPro

Lecture 6: Hybrid LCA Tiered and embedded analysis

IO analysis vs process LCA

- What are the differences between IO analysis and process LCA
  - LC calculations?
  - Data for database?
  - Results?

Hybrid LCA

- What is hybrid LCA? Which different kinds of hybrid LCA exists?
- Why not combine different databases in same model?
- What is the difference between tiered and embedded hybrid LCA?

Lecture 7: Disaggregating and detailing supply-use tables and IO models

Disaggregating IO models

- Why disaggregate?
- What are the challanges?
- IO classification: ownership based ⇨ LCA classification: activity based
- How to disaggregate?

Hybrid LCA in practise

- Copy-paste IO activities and refine – do you get the approach?
- For tiered LCA, what are the pros and cons of duplicating activities from the HIOT?
- How can double-counting be a problem?
- How to use IO data to estimate capital goods and services?
- How to use coefficient data (t fuel/tkm) to change unit of EXIOBASE transport activities?
- Why is it smart to operate with combustion activities?

Lecture 8: Consequential modelling in an IO database. Example of electricity markets

Consequential modelling in an IO database

- Consequential modelling is about
  - a) marginal market mixes and
  - b) modelling by-products using substitution
  - ⇨ how to model that in supply-use framework?
- Are there problems in the way we model by-products? (basic/purchaser's price issue?)
- How to compose a marginal supply-mix using a generalized algorithm?

Example of electricity markets

- Any questions on the margoinal electricity market example?

Lecture 9: Modelling of waste treatment and by-product utilisation in the SUT framework

Principle for organizing materials for treatment in the SUT framework

- What is a material for treatment?
- Why are they accounted with a negative sign?
- How to organize *flows of MFT* and *MTF activities* in the supply-use framework

Estimating waste quantities and type of treatment

- Any questions on estimating waste quantities using IO-based mass flow analysis?

Lecture 10: Introduction to hybrid LCA in SimaPro. Application examples

EXIOBASE in SimaPro

- What are the differences between producing industries and markets? When to use what?
- Why are there both ”linked” (tier 1) and ”terminated” (tier 2) data?
- How are the monetary market activities created?

Application examples

- Do you plan to work with IO/hybrid data in your project?
- Which challanges are you facing/foreseeing?

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Homework from last session: Wrap-up
- Calculating footprints within SUT framework

- Use data in excel file: 'Excel file for exercise.xlsx'

1. Calculate **Z** and **A**=**I**–**Z** and $\mathbf{A}^{-1}$
   a. Using the by-product technology assumption
   b. Optional: Using the industry technology assumption
2. Calculate the externalities (emissions and value added) for 1 EUR of each of the four product categories:
   a. Using the database based on the by-product technology assumption
   b. Optional: Using the database based on the industry technology assumption
3. Calculate the externalities (emissions and value added) for DK total final use (export + final use)
4. Why don't the calculated externalities add up to the same as the totals in the raw data?
5. Can you find a final use vector so that the externaties add up to the same as the ones in the raw data?

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Exercise 2: Make hybrid LCI of your case study

- Use Exiobase v3.3.16b2 in SimaPro

1. Identify the product category your case product (or part of) belongs to.
2. Copy-paste and modify to represent your product.
3. Analyse in SimaPro and identify key inputs (indicator GHG emissions) ⇨ Determine which inputs that need to be modified to be more representative.
4. Complete activities that need to be modified and link to these.
5. Calculate GHG emissions for your case product.
6. Document:
   - Draw flow chart of your foreground system.
   - Describe how you have made the hybrid data.
   - Summarize further needs for improvements.
   - Assess which differences you would experience if you had used process data.