

MDI210 : Numerical Analysis and Continuous Optimization

Robert M. Gower



Who am I?

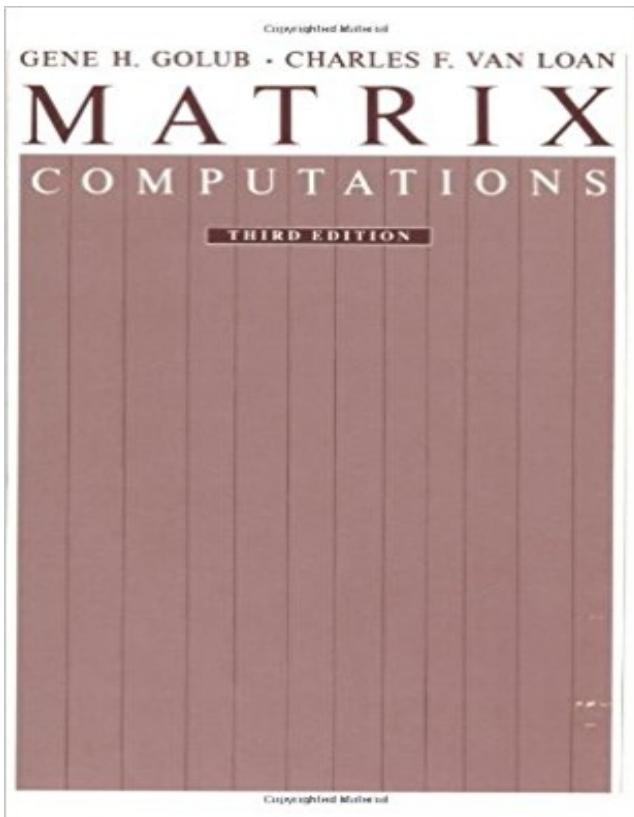
Robert M. Gower

- Assistant prof at Telecom
- `robert.gower@telecom-paristech.fr`
- <https://perso.telecom-paristech.fr/rgower/>
- Research topics: Stochastic algorithms for optimization, numerical linear algebra, quasi-Newton methods and automatic differentiation (backpropagation).

Core Info

- **Where** : Telecom ParisTech
- **Location**: Amphi Jade
- **Volume** : 28h
- **When** : 8 weeks
- **Exam**: One exam on ... approx 31st of October
- **Online**: Find lecture notes on my homepage
<https://perso.telecom-paristech.fr/rgower/teaching.html>
- **Exercices**: Do all exercises in the MDI210 lecture notes

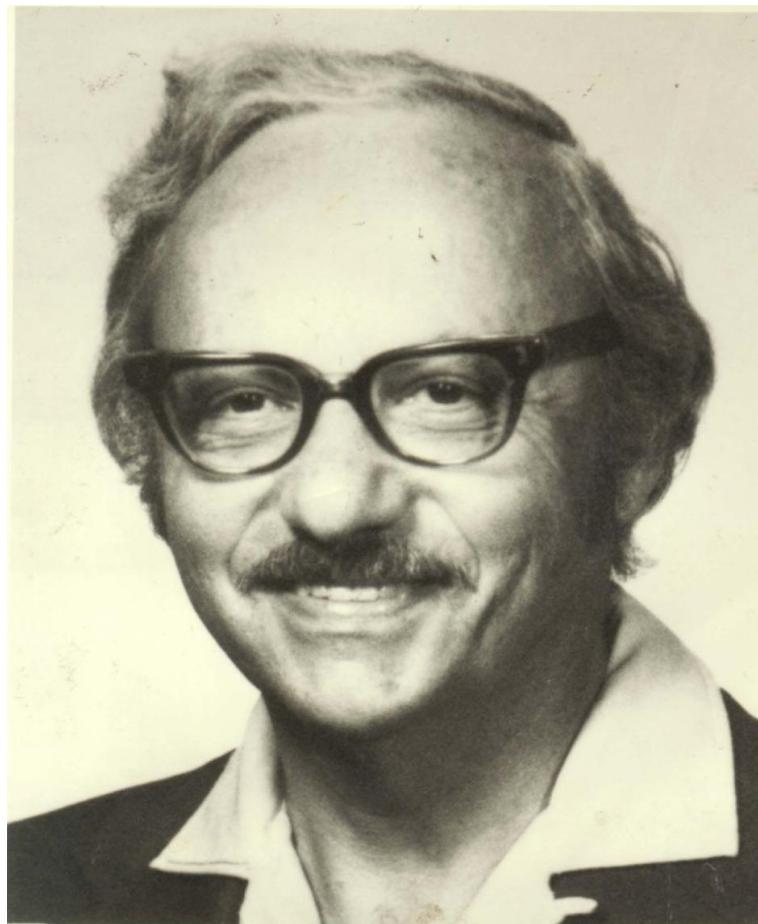
Additional References for Numerical Analysis



Matrix Computations:
Gene H. Golub and
Charles F. Van Loan

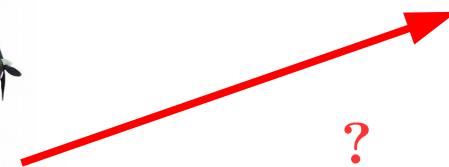
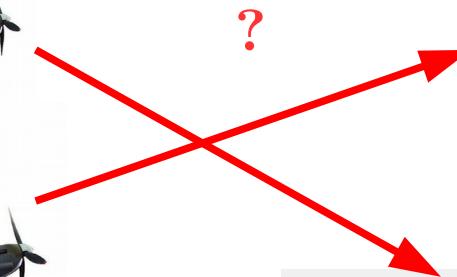
Three copies in the library on the 8th floor!

Linear Programming History (1939)

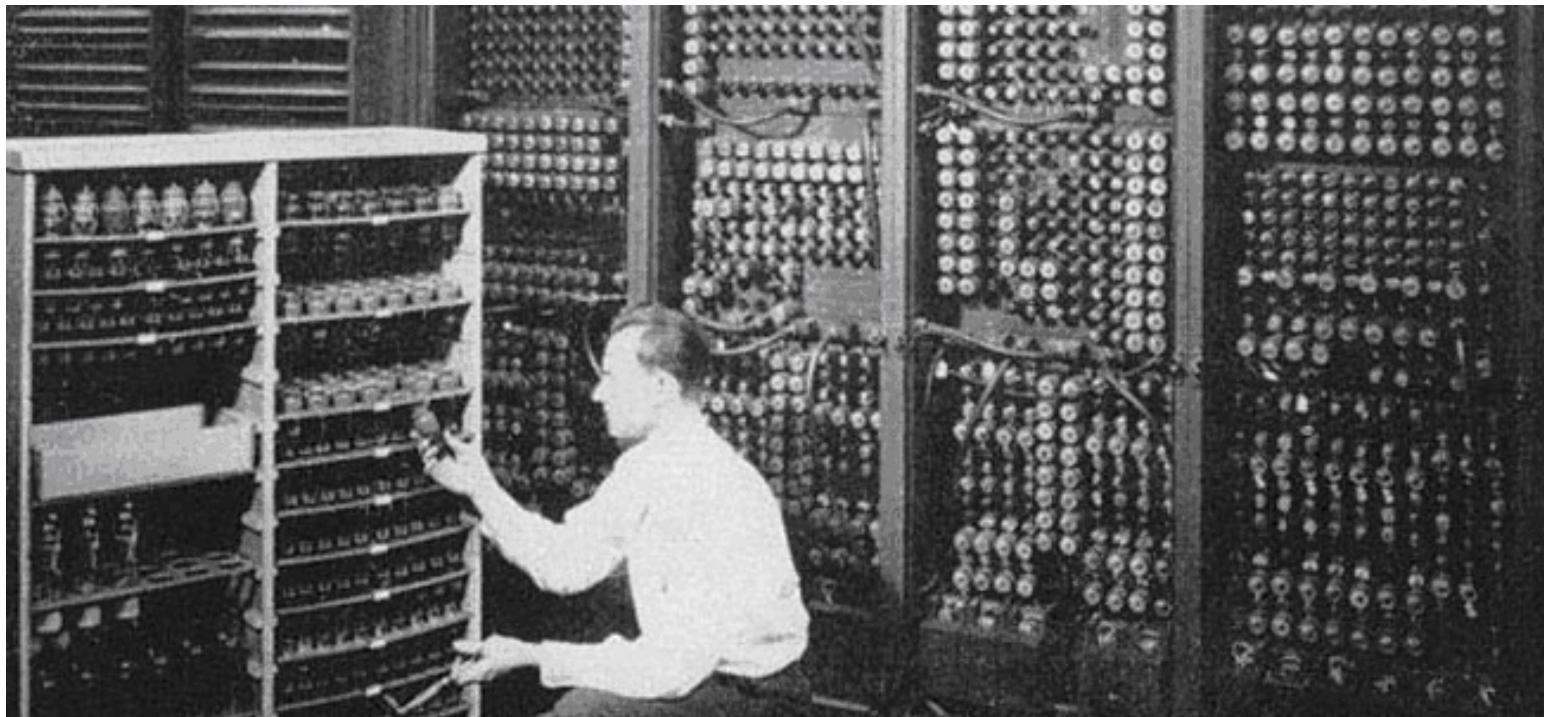


- 1947: George Dantzig, advising U.S. Air Force, invents Simplex.
- Assignment 70 people to 70 jobs (more possibilities than particles).

Linear Programming History (1941)



Army Builds Killing Machine (1949)



1949 SCOOP: Scientific Computation Of Optimal Programs

Mathematical Programming: Math used to figured out Flight and logistic programs/schedules

Dantzig the Urban Legend

The diagram contains numerous mathematical expressions and calculations. Some key elements include:

- A sphere with a horizontal axis labeled $\cos \varphi^2$ and a vertical axis labeled $\sin \varphi^2$.
- A circle with points labeled (a_1, m_1) , (a_2, m_2) , $(a_1 + a_2, m_1 + m_2)$, and $(a_1 - a_2, m_1 - m_2)$.
- Integrals and derivatives involving variables x , y , t , and θ .
- Trigonometric functions like $\sin \alpha$, $\cos \alpha$, and $\tan \alpha$.
- Limits and limit calculations.
- Statistical terms such as "const", "const.", and "const-const".
- Equations involving powers of 2, 3, and 5.
- Handwritten text in the background discussing the "Non-Existence of Tests of 'Student's' Hypothesis Having Power Functions Independent of Sigma."

Dantzig, George B. "On the Non-Existence of Tests of 'Student's' Hypothesis Having Power Functions Independent of Sigma." Annals of Mathematical Statistics. No. 11; 1940 (pp. 186-192).

Dantzig, George B. and Abraham Wald. "On the Fundamental Lemma of Neyman and Pearson." Annals of Mathematical Statistics. No. 22; 1951 (pp. 87-93).