

Plano de Ensino - Quantitative Information Flow - 2022/2

Código	DCC 030 / 049 / 831
Disciplina	<i>Quantitative Information Flow (Fluxo de Informação Quantitativo)</i>
Turma	A definir
Professor (es)	Mário S. Alvim
Público	(x) alunos de graduação (x) alunos de pós-graduação

Pré-requisites: Knowledge of discrete mathematics (sets, functions, basic proof techniques) and of discrete probability (joint, marginal and conditional probabilities, expected value, Bayes theorem).

Language: This course will be taught in English.

Syllabus: Review of discrete probability and of Bayesian inference. Models of uncertainty, and measures of information. Definition and fundamental properties of concrete and abstract information channels, information flow, and robustness of information-flow assessments. Applications of quantitative information flow.

More information: <https://homepages.dcc.ufmg.br/~msalvim/courses/qif/qif-ad-2022-2.pdf>

Programa

Lecture	Date	Topic
---	Aug-23	Welcome to New Students.
01	Aug-25	Introduction: An overview of Quantitative Information Flow
02	Aug-30	Introduction to QIF
03	Sep-01	Modeling secrets
04	Sep-06	On g-vulnerability
05	Sep-08	On g-vulnerability
06	Sep-13	Channels
07	Sep-15	Channels
08	Sep-20	Posterior vulnerability and leakage
09	Sep-22	Posterior vulnerability and leakage
10	Sep-27	Posterior vulnerability and leakage
11	Sep-29	Spare class / Review
12	Oct-04	First exam
13	Oct-06	Robustness / Capacity
14	Oct-11	Capacity
15	Oct-13	Composition of channels
16	Oct-18	Composition of channels / Instructions about the seminar
17	Oct-20	Refinement
18	Oct-25	Refinement
19	Oct-27	Discussion about the seminar
20	Nov-01	The Dalenius perspective
21	Nov-03	The Dalenius perspective / The geometry of hypers, gains

		and losses
22	Nov-08	Axiomatics
23	Nov-10	Applications: The Crowds Protocol
---	Nov-15	Holiday: "Proclamação da República"
24	Nov-17	Advanced topics: Differential privacy
25	Nov-22	Spare class / Review
---	Nov-24	No class: Brazil match on the World Cup
26	Nov-29	Second exam
27	Dec-01	Seminars
28	Dec-06	Seminars
---	Dec-08	Holiday: "Nossa Senhora da Conceição"
---	Dec-13	No class: World Cup Semi-final.
29	Dec-15	Seminars

Bibliografia

The Science of Quantitative Information Flow.

Mário. S. Alvim, Konstantinos Chatzikokolakis, Annabelle McIver, Carroll Morgan, Catuscia Palamidessi, Geoffrey Smith.
Springer International Publishing (2020).

Material de apoio

Moodle (slides and supporting material)

Avaliações

1	First Exam	25 pontos	October, 04
2	Second Exam	25 pontos	November 29
3	Seminar	30 pontos	December 01, 06, 15
4	Problem Sets	20 pontos	During the semester