Numerical Optimisation, COMPGV19

Numerical Optimisation, COMPGV19

- Staff Help
 - Login Problems?
 - Moodle Resource Centre
 - About Moodle at UCL
 - FAQs
 - Request a Moodle Course
 - Moodle Exam Notification
 - Moodle Training
 - Contact Moodle Support
 - UCL Moodle User Group
- Student Help
 - Login Problems?
 - Moodle Quick Start Guide
 - Moodle for e-Assessment

· Assignmenty Project Exam Help

- Subject area Study Skills
- IT training for Students/powcoder.com
 FAQs nttps://powcoder.com
- Turnitin Help
- More student links

<u>Services</u>

Vices Add WeChat powcoder New Moodle

- Moodle Snapshot
- Lynda
- Box of Broadcasts
- Portico
- Common Timetable
- Library
- MyAccount
- Live@UCL Email
- MyPortfolio
- My courses
 - Computer Science Module Evaluation Questionnaire Feedback
 - CS Virtual Auditing
 - Introduction to Deep Learning, COMPGI23/COMPM089
 - Inverse Problems in Imaging, COMPGV08/COMPM078
 - Numerical Optimisation, COMPGV19
 - Robot Vision and Navigation, COMPGX04
 - Robotic Control Theory and Systems, COMPGX02
 - Robotic Sensing, Manipulation and Interaction, COMPGX03
 - Robotic Systems Engineering, COMPGX01
 - Robotics and Computation Dissertation, COMPGX99
 - Supervised Learning, COMPGI01/COMPM055
 - <u>UCL Engineering MSc Central 2017/18</u>





• <u>Preferences</u>

Log out

Page path

- My home /
- COMPGV19

Assignment Project Exam Help Topic outline

General

https://powcoder.com

COMPGV19: Mundelcal Optimisation at powcoder

Lecturer: Marta Betcke (m.betcke@ucl.ac.uk)

Office hours: Term time: Tuesday 1pm-2pm, EFB 3.08 (call 34355 from the phone at the 3rd floor entrance from Roberts Building). Out of term per appointment.

Time/Room:

Monday: 11am-1pm Main Quad Pop Up G02 (lecture),

Tuesday: 9am-11am Torrington (1-19) G12 (lecture),

Wednesday: 10am-11am The Royal National Hotel, Galleon Suite B (tutorial)

[38-51 Bedford Way, Bloomsbury, London WC1H 0DG]

Form: 30h of lectures organised in 15 x 2h sessions (some lecture slots will be canceled at lecturers discretion)

10 x 1h tutorials weekly

This module teaches a comprehensive range of state of the art numerical optimization techniques.

It covers a number of approaches to unconstrained and constrained problems, methods for smooth and non-smooth convex problems as well as basics of non-convex optimisation.

Syllabus:

- Mathematical formulation and types of optimisation problems
- Unconstrained optimization theory e.g.: local minima, first and second order conditions
- Unconstrained optimization methods e.g.: line-search, trust region, conjugate gradient, Newton, Quasi-Newton, inexact Newton
- Smooth convex optimization: first order methods e.g. gradient descent, Nesterov, second order methods e.g. Newton
- Least Squares problems
- Constrained optimization theory e.g.: local and global solutions, first order optimality, second order optimality, constraints qualification, equality and inequality constraints, duality, KKT conditions
- Constrained optimization methods e.g.: penalty, barrier and augmented Lagrangian methods, least squares with smooth and non-smooth regularisation
- Non-smooth optimization e.g. subgradient calculus, subgradient methods, proximal operator, operator splitting, ADMM, non-smooth penalties e.g. L1 or TV.

Resources:

Numerical Optimization, Jorge Noredal and Stephen L Wright, Springer ASSIGNMENT Project Exam Help

Convex Optimization, Stephen Boyd and Lieven Vandenberghe, Cambridge University Press, see webpages of both authors for extensive collection of lecture notes.

In particular see Stephen Boyd's Convex Optimisation I and Convex Optimisation II slides. There is many other resources on the respective lecture pages including special tutorials, publications, codes and video cast of the lectures.

Add WeChat powcoder

Nick Gould's lectures on nonlinear optimisation can be found <u>here</u>. On the page you can find lecture slides as well as the accompanying paper. In particular recommended for its detailed treatment of the KKT system.

Assessment: 5% x 8 coursework

60% project (20% proposal + 40% execution)



Assessment

Assessment

Assignment 1-4 Assignment (Turnitin)

The assignments 1-8 will be a series of short problems set weekly for submission through TurnItIn and Cody Courseworks@Mathworks before the next tutorial session (ie. by 10am on Wed) when the solutions will be discussed and made available online. Therefore, **no late submission will be possible**.

You are required to submit a short PDF report generated by the MATLAB's "publish" function from your solution script and upload your implementation of algorithms to Cody Courseworks@Mathworks as specified in each assignment. In your report please comment on each step of your solution (numerical and analytical) and whenever needed use latex code to include equations. You can answer the theoretical questions outside of MATLAB script in an extra document. Please merge the resulting PDFs, with the theoretical part first, followed by the MATLAB published PDF.

Cody coursework Numerical Optimisation is hosted at

https://coursework.mathworks.com/v2/courses/4113-numerical-optimisation

Please make sure that .../v2/... appears in the path, as there seem to be two versions of the platform which is not transparent and the course is only visible under v2.

The mark and short feedback (complementary to the solutions made available online) will be returned via Moodle within a week.

Assignment Project Exam Help

EDIT: Mathwoks has merged the websites with v2 and without it. Please submit your assignments to

https://powcoder.com https://coursework.mathworks.com/courses/4113-numerical-optimisation

· PassiAndd-8Wsienchartnipowcoder

Project proposal Assignment (Turnitin)

The attached project description is an example of a problem you could approach. However, you are free to consider any problem provided it is **sufficiently challenging and it can be solved by optimisation**. You can take **an equivalent level of difficulty problem from your specific field**.

The goal of the proposal is to provide background research on the particular problem, formulate it in optimisation framework, and propose case studies. Note, you are not required to propose methods for its solution, this will be the subject of the project itself. Just identify the type / characteristics of the problem (linear, convex, constraint/unconstraint etc). Take the described subsampled MRI example as a gauge of the level of research and analysis required for the standard component and what would be considered as a challenge.

You are required to submit a PDF report of length up to approximately 2000 words (excluding captions and references).

The feedback will be returned via Moodle within 4 weeks.

- Project proposal: Example problem File 107KB PDF document
- Project Assignment (Turnitin)

The project will involve solving the real world optimisation problem identified and derived in the proposal.

The attached proposal and project description should be taken as an example of a problem you could approach. However, you are free to consider any problem provided it is **sufficiently challenging and it can be solved by optimisation**. You can take **an equivalent level of difficulty problem from your specific field**.

The aim of the project is then to investigate *different* ways of solving this optimisation problem under *different* regimes. Again, let the described subsampled MRI image reconstruction problem guide you about the level of problem study that should be undertaken to achieve the standard component and how to include a challenge component into your problem.

You are required to submit a PDF report of length approximately 2000 words (excluding captions and references) *complementary* to the proposal submitted earlier. The report should identify the challenges of the proposed optimisation problem, motivate your choices of optimisation methods for its solution, design relevant case studies and evaluate the obtained results.

The accompanying Matlab codes should be submitted as a zip archive folder named after you e.g. "JohnSnow" containing "solution.m" script and all necessary support functions. You can use any codes which were given out as a solution to the assignments in the course of the lecture or reuse your tryn implementations. It is your responsibility that the Solution of the lecture of the

The report contributes 80% and the generated html 20% to the mark for this component. $Add \ We Chat \ powcoder$

The feedback will be returned via Moodle within 4 weeks.

- Project description: Example problem File 113.3KB PDF document
- Assignments

Assignments

- Assignment 0: Example





- Assignment 1

assignment1.pd f

solution1.pdf

Assignment Project Exam Help

https://powcoder.com

Add WeChat powcoder

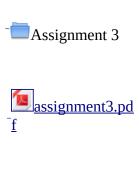
- Assignment 2

assignment2.pd

lineSearch.m

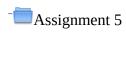
solution2.pdf

zoomInt.m



·Assignment Project Exam Help https://powcoder.com

--- Assigned WeChat powcoder



Assignment Project Exam Help





mcg.m

solution6.m

solverCM2dSubspaceExtLS.



surfaceFunc vector.

surfaceGrad.m

surfaceHess.m

trustRegionLS.

Assignment Project Exam Help

visualizeSurface.//powcoder.com

Add WeChat powcoder

- Assignment 7

assignment7.pd

solution7.pdf

solverCMlevenberg.

Assignment 8



backtracking.m

Assignment Project Exam Help

https://powcoder.com

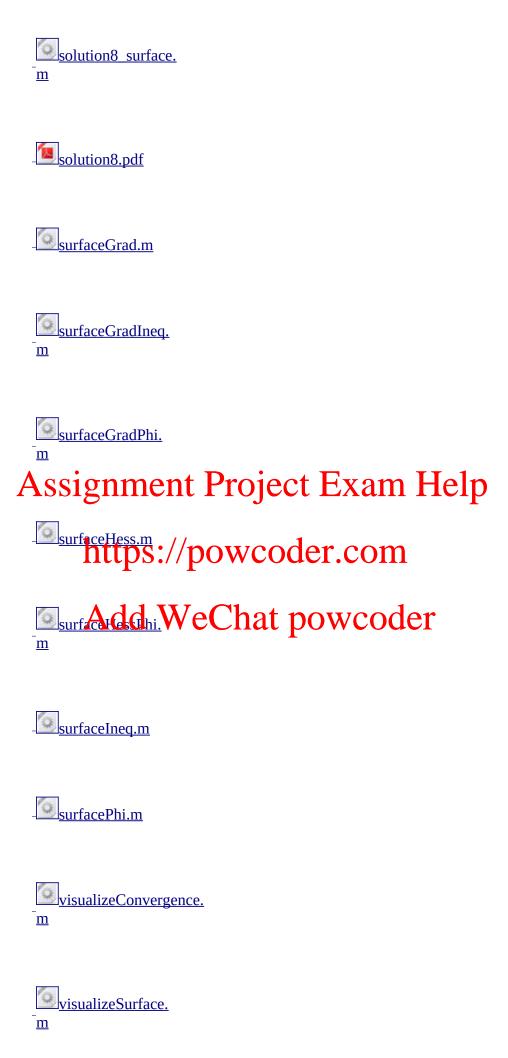
interiArPoint BWWeChat powcoder

interiorPoint PrimalDual.

lineSearch.m

realLog.m

solution8 exercise2.





- Download folder
- Background

Background

- Background: Lecture slides File 730.5KB PDF document
- Background: Notes File 7.5MB PDF document
- Line search

Line search

- Line search: Lecture slides File 522.2KB PDF document
- Trust region

ust region: Lecture slides File 333.4KB PDF document

- Conjugate gradient

https://powcoder.com

Conjugate gradient

- Conjugate to die Wier ture Size to FID OWE CO de finent
- Conjugate Gradient: Notes File 1.6MB Image (JPEG)
- Quasi-Newton

Quasi-Newton

- Quasi Newton: Lecture slides File 284KB PDF document
- Large-scale

Large-scale

- Large scale: Lecture slides File 434.3KB PDF document
- · Least squares

Least squares

- Least squares: Lecture slides File 322.9KB PDF document
- Constraint optimisation

Constraint optimisation

Constraint optimisation: Lecture slides File 320.9KB PDF document

Solution of problems with equality constraints

Solution of problems with equality constraints

- Solution of problems with equality constraints: Lecture slides File 165.3KB PDF document
- Constraint optimisation: penalty and augmented Lagrangian methods

<u>Constraint optimisation: penalty and augmented Lagrangian</u> methods

- Penalty and augmented Lagrangian methods: Lecture slides File 2.8MB PDF document
- Constraint optimisation: interior point methods

Constraint optimisation: interior point methods

- <u>Interior point methods: Lecture slides File</u> 298KB PDF document
- Nonsmooth optimisation

Nonsmooth optimisation

- Assignment Project Example Lon
- Tutorial on Nonsmooth Methods File 104KB PDF document
- https://powcoder.com

Skip Navigation

Add WeChat powcoder



Navigation

- My home
 - Site home
 - Legacy Moodle
 - Site blogs
 - Site badges
 - Tags





- Current course
 - COMPGV19
 - Participants





Badges



https://powcoder.com

Assignments

Add We Chat powcoder

- Line search
- Trust region
- Conjugate gradient
- Quasi-Newton
- Large-scale
- Least squares
- Constraint optimisation
- Solution of problems with equality constraints
- Constraint optimisation: penalty and augmented Lag...
- Constraint optimisation: interior point methods
- Nonsmooth optimisation
- My courses



Settings

- Course administration
 - Grades
 - Competencies

Skip Library Resources



Library Resources https://powcoder.com

- © UCL Explore
- wise Informational WeChat powcoder
- . [
- Reading List Numerica
- 🧜

Past Exams Numerica

Skip MyFeedback



MyFeedback

The MyFeedback dashboard allows students and their personal tutors to view feedback and grades across modules in one place.

Go to MyFeedback 2

Skip Search forums



Search forums



Skip Latest announcements



Latest announcements

- 25 May, 21:02
 Marta M Betcke
 Revised marks / check your feedback!
- 24 May 17 stignment Project Exam Help
 Project marks
- 9 May, 22:05
 Marta M Betckenttps://powcoder.com
 Delay in returning project marks
- 28 Mar, 10:25
 Marta M Betcke Add WeChat powcoder

 Project codes clarified WeChat powcoder
- 14 Mar, 16:38
 Charlie Tickle
 Change of Teaching Venue Wednesday 21st March 2018





Upcoming events

There are no upcoming events Go to calendar...

New event...
Skip Recent activity



Recent activity

Activity since Saturday, 4 August 2018, 2:23 PM Full report of recent activity...

No recent activity

Facilities

- Faculties and departments
- <u>Library</u>
- Museums and Collections
- UCL Bloomsbury Theatre
- Maps and buildings

Locations

- UCL and London
- : UCL Australia gnment Project Exam Help

Connect with https://powcoder.com

- Alumni
- Businesses
- Media Relations Add We Chat powcoder
- Jobs
- Support us

University College London, Gower Street, London, WC1E 6BT Tel: +44 (0) 20 7679 2000

Copyright © 2013 UCL Disclaimer | Freedom of Information | Accessibility | Privacy | Cookies | Contact Us

UCL Moodle usage policy and guidelines

Powered by: Moodle 3.1

e

