

Unit 7 - Week 4

Course outline
How to access the portal?
Pre-Requisite Assignment
MATLAB Access and Learning Modules
Week 1
Week 2
Week 3
Week 4
<ul style="list-style-type: none"> Introduction to green's Function: 3-D example Methods of Moments : Motivation for MoM Method of Moments : Linear Vector Spaces Method of Moments : Formulating Method of Moments Method of Moments : Surface Integral Equations: Recap Method of Moments : Surface Integral Equations: Evaluating the Integrals part 1 Method of Moments : Surface Integral Equations: Evaluating the Integrals part 2 Method of Moments : Surface Integral Equations: Conclusion Method of Moments : Volume Integral Equations:Setting Up
Quiz : Assignment 4
Week 4 Feedback : Computational Electromagnetics
Week 5
Week 6
Week 7
Week 8
Week 9
Week 10
Week 11
Week 12
DOWNLOAD VIDEOS
Live session
Text Transcripts

Assignment 4

The due date for submitting this assignment has passed. As per our records you have not submitted this assignment.

Due on 2019-08-28, 23:59 IST.

- 1) The linear differential equation $L\phi(r) = f(r)$ is solved by which of the following steps (assume $b_n(r)$ is a basis function and $t_m(r)$ is a testing function): **1 point**
- Expanding $\phi(r)$ in terms of $b_n(r)$ and taking inner product with $t_m(r)$
 - Expanding $\phi(r)$ in terms of $b_n(r)$ and taking inner product with $b_n(r)$
 - Expanding $\phi(r)$ in terms of $t_m(r)$ and taking inner product with $t_m(r)$
 - Expanding $\phi(r)$
 - None of the above

No, the answer is incorrect. Score: 0

Accepted Answers: Expanding $\phi(r)$ in terms of $b_n(r)$ and taking inner product with $t_m(r)$

- 2) In the method of moments taught in the class,the matrix elements A_{mn} for solving the equation $L\phi(r) = f(r)$ are given by **1 point**
- $A_{mn} = \langle t_m(r), b_n(r) \rangle$
 - $A_{mn} = \langle b_n(r), Lt_m(r) \rangle$
 - $A_{mn} = \langle t_m(r), Lb_n(r) \rangle$
 - $A_{mn} = \langle b_n(r), Lb_n(r) \rangle$
 - $A_{mn} = \langle t_m(r), Lt_n(r) \rangle$
 - None of the above

No, the answer is incorrect. Score: 0

Accepted Answers: $A_{mn} = \langle t_m(r), Lb_n(r) \rangle$

- 3) The gradient of 2D Green's function, $\nabla g(\vec{r}, \vec{r}')$, is given by (\hat{p} is the unit vector along $\vec{r} - \vec{r}'$): **1 point**
- $(jk/4)H_0^{(1)}(k|\vec{r} - \vec{r}'|)\hat{p}$
 - $(jk/4)H_1^{(1)}(k|\vec{r} - \vec{r}'|)\hat{p}$
 - $(jk/4)H_0^{(2)}(k|\vec{r} - \vec{r}'|)\hat{p}$
 - $(jk/4)H_1^{(2)}(k|\vec{r} - \vec{r}'|)\hat{p}$

No, the answer is incorrect. Score: 0

Accepted Answers: $(jk/4)H_1^{(2)}(k|\vec{r} - \vec{r}'|)\hat{p}$

- 4) What is the value of the following integral as ϵ tends to zero? **1 point**
- $\int_{\epsilon}^a \ln x dx = a \ln a - a$
 - $\int_{\epsilon}^a \ln x dx = 1/a$
 - $\int_{\epsilon}^a \ln x dx = -\infty$
 - $\int_{\epsilon}^a \ln x dx = 0$
 - $\int_{\epsilon}^a \ln x dx = +\infty$

No, the answer is incorrect. Score: 0

Accepted Answers: $\int_{\epsilon}^a \ln x dx = a \ln a - a$

- 5) Why does the integral $\int_D \nabla g(\vec{r}, \vec{r}') \cdot \hat{n} dl$ evaluate to zero when the integration domain D is such that $\vec{r} \neq \vec{r}'$? **1 point**
- $g(\vec{r}, \vec{r}') = 0$ for the domain D
 - Magnitude of $\nabla g(\vec{r}, \vec{r}')$ is zero for the domain D
 - $\nabla g(\vec{r}, \vec{r}')$ is perpendicular to \hat{n} for the domain D
 - None of the above

No, the answer is incorrect. Score: 0

Accepted Answers: $\nabla g(\vec{r}, \vec{r}')$ is perpendicular to \hat{n} for the domain D

- 6) What does the absolute value of the integral $\int_D \nabla g(\vec{r}, \vec{r}') \cdot \hat{n} dl$ evaluate to, when the integration domain D is such that $\vec{r} = \vec{r}'$? **1 point**
- 0
 - 1/2
 - 1
 - ∞

No, the answer is incorrect. Score: 0

Accepted Answers: 1/2

- 7) What is the value of the Hankel function $H_0^{(2)}(x)$ for $x = 2e^{-5}$ (γ is the Euler constant)? **1 point**
- $H_0^{(2)}(x) \approx 1 - j\frac{2}{x}(-5 + \gamma)$
 - $H_0^{(2)}(x) \approx 1 + j\frac{2}{x}(-2 + \gamma)$
 - $H_0^{(2)}(x) \approx j\frac{2}{x}(5 + \gamma)$
 - $H_0^{(2)}(x) \approx -j\frac{2}{x}(2 + \gamma)$

No, the answer is incorrect. Score: 0

Accepted Answers: $H_0^{(2)}(x) \approx 1 - j\frac{2}{x}(-5 + \gamma)$

- 8) Can the Surface Integral Equation be used to solve for the scattered field from a non homogeneous object? **1 point**
- Yes, it can be easily done analytically for any object
 - Yes, it can be done, if the Green's function is provided
 - No, because we can model only homogeneous objects using Green's function
 - None of the above

No, the answer is incorrect. Score: 0

Accepted Answers: Yes, it can be done, if the Green's function is provided

- 9) Which of the following definition(s) describes Galerkin's method? **1 point**
- Choosing pulse basis and delta testing functions
 - Choosing pulse basis and pulse testing functions
 - Choosing the same basis and testing functions
 - Choosing full domain basis and pulse testing functions
 - Galerkin's method is another name for Method of Moments

No, the answer is incorrect. Score: 0

Accepted Answers: Choosing pulse basis and pulse testing functions
Choosing the same basis and testing functions

- 10) Solving the Surface Integral Equation using the Method of Moments involves solving what type of equations? **1 point**
- Underdetermined system
 - Well-determined system
 - Overdetermined system
 - Eigenvalue problem

No, the answer is incorrect. Score: 0

Accepted Answers: Well-determined system