Unit 14 - Week 12: Solution Procedure

Assignment 12

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

Due on 2020-12-09, 23:59 IST.

1) Choose True/False for the following assertion: "The order of convergence of the full Newton-Raphson method is two." ***1 point***

- (a) True
- (b) False

No, the answer is incorrect.
Score: 0
Accepted Answers:
(a) True

2) Choose True/False for the following assertion: "The modified Newton- Raphson method takes more steps to solution as compared to the full Newton-Raphson method but is faster per iteration." ***1 point***

- (a) True
- (b) False

No, the answer is incorrect.
Score: 0
Accepted Answers:
(a) True

3) Choose True/False for the following assertion: "The line search method should be used when the convergence of the Newton-Raphson method becomes slow or it diverges." ***1 point***

- (a) True
- (b) False

No, the answer is incorrect.
Score: 0
Accepted Answers:
(a) True

4) Choose True/False for the following assertion: "The arc length method cannot be applied to problems where there are no limits points." ***1 point***

- (a) True
- (b) False

No, the answer is incorrect.
Score: 0
Accepted Answers:
(b) False

For Questions 5 - 12 use the following: Consider three nonlinear springs. Springs 1 and 2 are connected in parallel. They are fixed at one end (say the left end) while at the other end they are connected in series to spring 3. The stiffness of spring 1 is $k_1 = 500 + 50u$, stiffness of spring 2 is $k_2 = 200 + 100u$, and stiffness of spring 3 is $k_3 = 500 + 100u$ where u is the elongation in the spring. Assume that a load $F = 150$ units is applied at the free end of the (say right end) of spring 3. Assume tolerance of 0.000001 and initial guess of $u_1 = 0$ and $u_2 = 0$ where u_1 is the extension in spring 1 or 2 and u_2 is the displacement of the right end of the spring 3 where force F is applied. Our objective is to find the displacements u_1 and u_2 using full Newton-Raphson method. (Suggestion: Write a computer code to solve !)

5) The displacement u_1 at the end of first iteration is _____. (up to two decimal places only).

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) .17,.25

1 point

6) The displacement u_2 at the end of first iteration is _____. (up to two decimal places only).

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) .45,.55

1 point

7) The displacement u_1 at the end of second iteration is _____. (up to two decimal places only).

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) .15,.25

1 point

8) The displacement u_2 at the end of second iteration is _____. (up to two decimal places only).

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) .43,.53

1 point

9) The displacement u_1 at the end of third iteration is _____. (up to two decimal places only).

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) .15,.25

1 point

10) The displacement u_2 at the end of third iteration is _____. (up to two decimal places only).

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) .45,.55

1 point

11) The displacement u_1 at the end of fourth iteration is _____. (up to two decimal places only).

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) .15,.25

1 point

12) The displacement u_2 at the end of fourth iteration is _____. (up to two decimal places only).

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) .45,.55

1 point