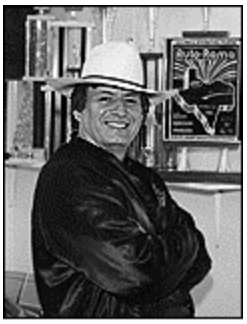
Richard Alfred Tapia



Richard Alfred Tapia was born on March 25, 1939 in Los Angeles California. As a boy, his parents, especially his mother, taught him and his siblings many of the important things in life. School as a young boy was not some of the happiest days of Tapia's life. He was constantly teased and insulted by his classmates because of his Mexican heritage. He lost many of his friends to drugs and dropping out of school.

After receiving his degree in mathematics from UCLA, he went on to graduate school, where he decided to pursue a university career. Since the beginning of his career, Tapia has made it a life long goal to reach out to minorities. He wants to show them that if they really want to do something they can. He especially wants to improve their participation in mathematics.

Today Tapia is employed at Rice University in Houston, Texas as the Noah Harding Professor of Computational and Applied Mathematics. He has had numerous publications and been given many awards. Despite his success in life, Tapia still faces racial discrimination. He has a hard time trying to figure out where he fits in. When he goes to Mexico, he is called a "gringo," implying that he is not really Mexican, and in the US he is teased for being Mexican. It is an issue that he still ponders today.

In one of Tapia's papers entitled, "The Weak Newton Method and Boundary Value Problems", he determines the numerical solutions to a system of equations. In the following exercises, use regular Newton's method to find an answer.

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1. **Newton's Method converges _____ provided $f'(x) \neq 0$ (near the root) and $f''(x)$ exists and is not unbounded.**

1. **Use the following non-linear system of equations to solve the problems below. Use the starting point (-0.5, .25):**

$$eq1 = 2x^2 + 3y^2 - 1$$
$$eq2 = y^3 - 7x^3 - 1$$

a) Find the Jacobian matrix, which is $\begin{vmatrix} \partial f_1/\partial x & \partial f_1/\partial y \\ \partial f_2/\partial x & \partial f_2/\partial y \end{vmatrix}$.

b) Calculate the wron (determinant of the Jacobian matrix).

c) Walk through 1 step of Newton's method to find both a_1 and a_2 using the following formulas.

$$x^{(n+1)} = x^{old} - ((\partial f_2/\partial y)* eq1 - (\partial f_1/\partial y)*eq2))/wron$$
$$y^{(n+1)} = y^{old} - ((\partial f_1/\partial x)*eq2-(\partial f_2/\partial y)*eq1))/wron$$

References

SACNAS Biography: Richard A. Tapia, Mathematician
http://www.sacnas.org/bio/tapiahig.htm

Featured Scientists: Richard Tapia, Ph.D.
http://www.breakthrough.org/series/scientist/bios/Tapia/tapia.htm

The Weak Newton Method and Boundary Value Problems
http://www.jstor.org/cgi-bin/jstor/viewitem/00361429/di976155/

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http://www.mathsci.appstate.edu/~hph/4310

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Brookes/Cole Publishing Company, 1999.