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Optimizing and Simulating Harmonic Control in Virtual Reality Environment – A Review

Kinshuk[1] & Ms. Garima Garg[2]
[1] M. Tech scholar, SGI, Samalkha, Haryana
[2]Assistant Professor, Computer Science deptt, SGI Samlkha

ABSTRACT -
A new wave simulation technique for the elastic wave equation in the frequency domain based on a no overlapping do-main decomposition algorithm is investigated. The boundary conditions and the finite difference discrimination of the elastic wave equation are derived. The algorithm of no overlapping domain decomposition method is given. The method solves the elastic wave equation by iteratively solving sub problems defined on smaller sub domains. Numerical computations both for homogeneous and inhomogeneous media show the effectiveness of the proposed method. This method can be used in the full-waveform.

Keywords – Simulation; Waves; irregularity; 3D world

CHAPTER – 1

INTRODUCTION

The perturbation of quantum harmonic oscillators with external fields has recently attracted a renewed interest due to different aspects of the problem, catalysed by recent developments as follows: 1) quantum dynamics of ion in a Paul trap [6], 2) confining potentials for various quantum hetero structures, which leads to modifications of various physical properties of the media they are composed of [7,8] 3) dynamics of a harmonic oscillator with time-dependent force constant and perturbed by weak quartic anharmonicity 4) need for exact propagators for the anisotropic two-dimensional charged harmonic oscillator in presence of external fields .

The effects of external fields on systems under the effect of other types of potentials like pseudo-harmonic oscillator potential have also been explored in literature. For example, the effect on energy levels of a 2D Klein Gordon particle under pseudo-harmonic oscillator inter- action has been studied. The Schrödinger equation has been solved for a particle in the general 1D time-dependent linear potential . The quantum motion of an electron driven by a strong time-dependent linear potential in a 1D quantum wire has been investigated and interesting physical properties studied . The possibility of exactly manipulating the quantum motional states of a single particle held in a double cosine potential by using laser beams has been explored

An electron in confined-harmonic oscillator potential exposed to an external electric field is equivalent to a charged harmonic oscillator in a uniform electric field or a harmonic oscillator in an external dipole field. Such a system has an important role in quantum chemical applications Polynomials are incredibly useful mathematical tools as they can be calculated very easily and accurately on computer systems. Their evaluation is also fast. They are capable of representing a tremendous variety of functions, can be differentiated and integrated quite easily, and can be pieced together to form spline curves that can approximate any function to any desired

accuracy. The B-polynomial method is, therefore, much simpler and efficient. Recently, J. Liu *et al*. have proposed a new numerical method based on B-polynomials expansion for solving one dimensional elliptic interface problems. B-polynomial basis has also been used for numerically solving differential equations. (Lumb, 2013)

Simulation - Numerical simulations *i.e.* the use of computers to solve problems by simulating theoretical models is part of new technology that has taken place alongside pure theory and experiment during the last few decades. Numerical simulations permit one to solve problems that may be inaccessible to direct experimental study or too complex for theoretical analysis. Computer simulations can bridge the gap between analysis and experiment. Numerical simulations analysis and experiment cover mutual weakness of both experiment and theory. These simulations will remain a third dimension in ultrasonic measurements, of equal status and importance to experiment and analysis. It has taken a permanent place in all aspects of ultrasonic measurements from basic research to engineering design. The computer experiment is a new and potentially powerful tool. By combining conventional theory, experiment and computer simulation, one can discover new and unsolved aspects of natural process. These aspects could often neither have been understood nor reveled by analysis or experiments alone.

CHAPTER – 2

LITERATURE REVIEW

The technological advances have a direct effect on our life and on our behavioral manner. The Augmented reality moves from the industrial niches to mass technology. It can be defined as an emergent form of practice, through which the real world is improved through computer generated content that is connected to particular places and/or events. In other words, AR permits the digital content to be effortlessly superimposed and inter- mingled into our insights and conception of the real world . Augmented reality can be described as one of the technologies that can develop a “next generation, reality- based interface”. Also, it is distinguished by promotion from just being in test centers around the world to being used in different fields and consumer markets. Nowadays with the emergence and diffusion of the smart phones and AR browsers, we begin to accept this different and exciting type of human-computer communication In spite of the fact that AR has gained much more re- search interest and attention recently, various meanings are attached to the term AR by researchers. Besides, AR could be developed through using and involving different inventive technologies (for instance, body-borne computers, mobile phones, and immersive technologies) .During the last years, the AR applications have turned out to be transportable and broadly accessible on mobile phones. Also, the AR has become one of our audio-visual media (for instance, news, means of entertainment and sports). In addition, it is being used recently in many fields such as electronic commerce, tourism and pro- motion. Besides, it has turned to be a very significant part of the Virtual Reality (VR) domain. The AR enjoys clear advantages in comparison to the traditional VR. One of the key advantages gained by AR is having a better sense and interaction of reality whereas it lays emphasis on the organic integration of virtual environment and the real world In this article we present a survey of the state of the art in AR. Our aim is to provide a better understanding of the current and future application areas in this emerging field.

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CHAPTER - 3

PROPOSED WORK

Objectives

1. Harmonic wave behavior is simulated.
2. Inefficient harmonic output is obtained
3. A separate double axis subsystem is build to optimize the performance of inefficient harmonic waveform.
4. Optimized and efficient harmonic wave output is achieved.
5. To show the comparison between two outputs.
6. This output is made to be feuded into virtual reality system to obtained a real time 3D implementation of simulated optimized output.

Methodology Used

1. Total of 6 gain blocks are used with following functions to amplify and input the signal input.

M1 = mass of wave in stationary position

M2 = mass of wave in uniform movement.

g= effect of acceleration due to gravity

L = Longitudinal length of the wave

Bt = Forward motion variable

Br = Rotational motion variable

2. These 6 parameters are used and values are input using Matlab window.
3. Two adders are used to add the signals coming out of the gain block.
4. Integrator blocks are used to convert derivates form equation to its original form.
5. Scope is used to obtain and interpret the output curve.
6. Corresponding output is obtained.

CHAPTER – 4

RESULT AND ANALYSIS

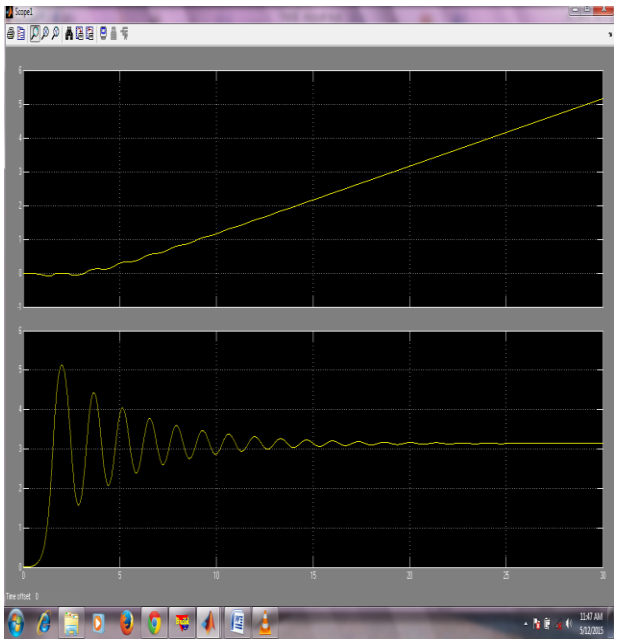

Figure 4.1 – simulated and optimized output

Here top axis shows the inefficient harmonic curve and bottom axis shows the efficient and optimized harmonic wave simulated.

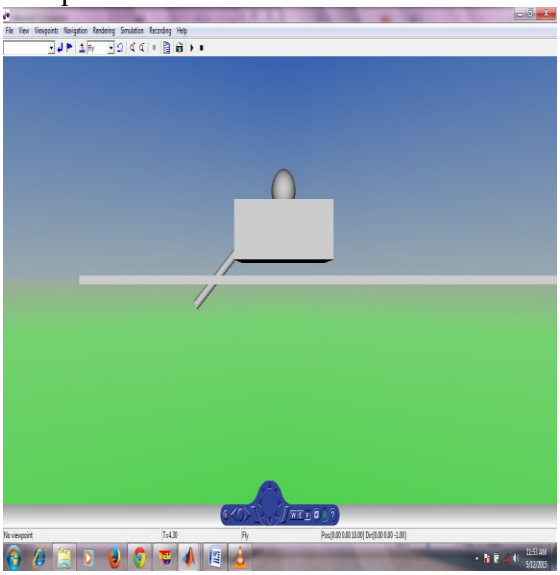

Figure 4.2 – Harmonic wave oscillation

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