



Case Study Articles on Molecular Dynamics and Control System Promotion

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Abstract

Molecular Dynamics had come up with the motivation for analyzing of fluid dynamics, other specific phenomena of fluid or thermal mechanics. As computational analyzing capability has been continuously rising up, this techniques and methods also have been expanding over possible fields with material science, related fields with quantum dynamics and science as well [1]. Recently it is to be applicable for possible material phenomena estimation as computer hardware technology is going on further advance [2]. This case study report includes the application for parts production Equipment with possible IT applications and also positive application of mathematical solutions with embedded system application.

Keywords

Molecular; Dynamics; Control engineering; System; Embedded system; Parts production; IE; Curve fit

Introduction

Gas simulation studies have been showing the essence of material dynamics in real worlds for several decades, one paper obtained simulation study with CO₂ for carbon oxide environmental resolution [3]. These study provisions had been given even before 3.11.2011 although these values are once again found out these days due to the extraordinary advances in Computer technology. For 3.11 resolutions in Engineering on Science, looking at the trend transitions it would be rather important to put combinations of gas simulation studies and controlling studies by data. This article is to show one portion of

proposals containing these.

MD for Elastic Model, in the imagination with gas molecular structure

As essential model, the simulation was done on 10 by 10 atomic model governed by Van der Waals Force. It is determined by Lennard-Jones Potential which is expanded in a poly-nominal expression without Quantum effects.

On the model stated, pull force model simulation was done by position, velocity, acceleration equation. Former process on the stabilizer starts up with temperature criteria to become stable value, like 30K in the imaginary field.

Simulation environment was set up on MS-DOS PC with MS-Fortran built in (Figure 1 and Figure 2).

MD for Plastic Model for Crack Propagation Model

Molecular Dynamics is applicable for crack propagation by simulation as well. This case is to build up 40 by 40 atomic model governed by Steel, Iron small structure model in 40 by 40 atomic array. It is to confirm parameter eligibility of CED in abbreviation of Crack Energy Density model to determine deformation's starter in process. For stabilizer process, temperature imaginary assumption was on 50K or around. Simulation model was built up in Unix C, environment (Figure 3).

Embedded Model Application for Parts Manufacture, Quality System

Case of LED products in mass production process

As initial process flow tends to get the process fluctuated as seen in several sites, especially for the cases with heat production process such as LED or semiconductor parts process. This is one case obtained by the samples at possible manufacturing process, business frames Figure 1.

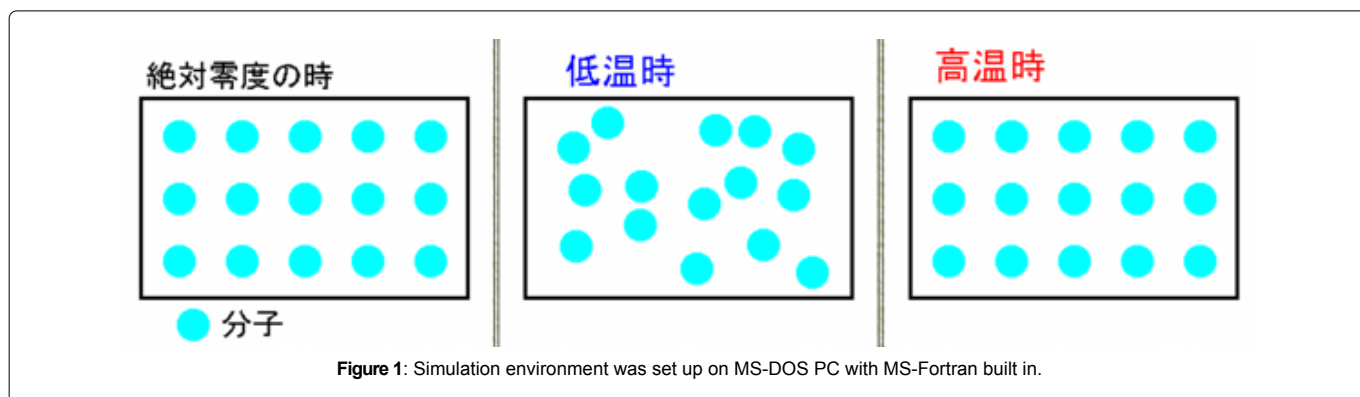
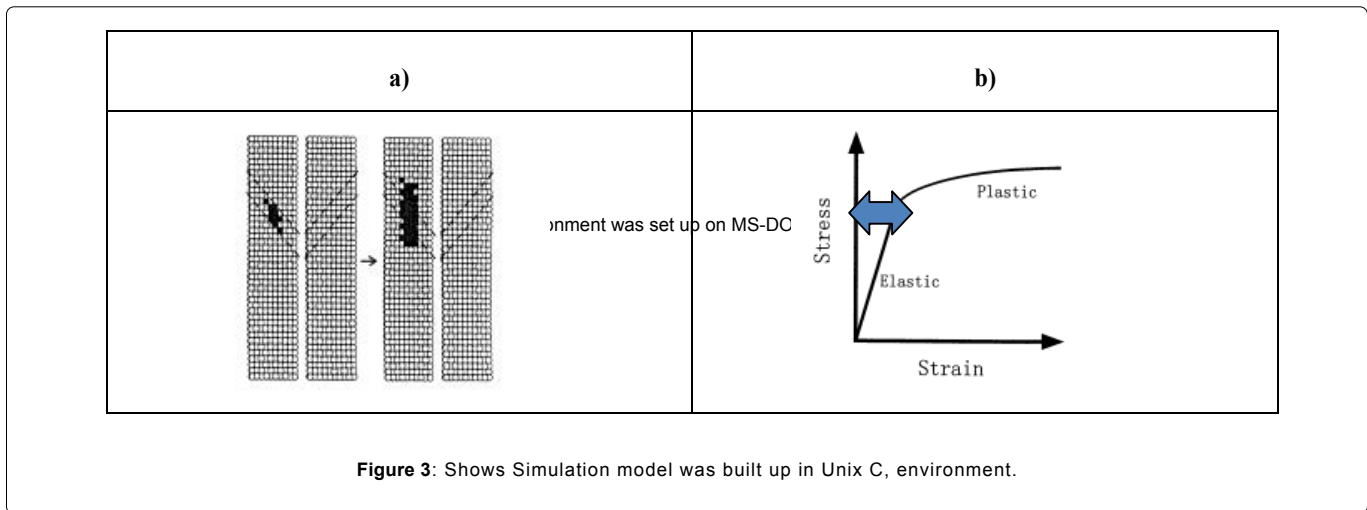
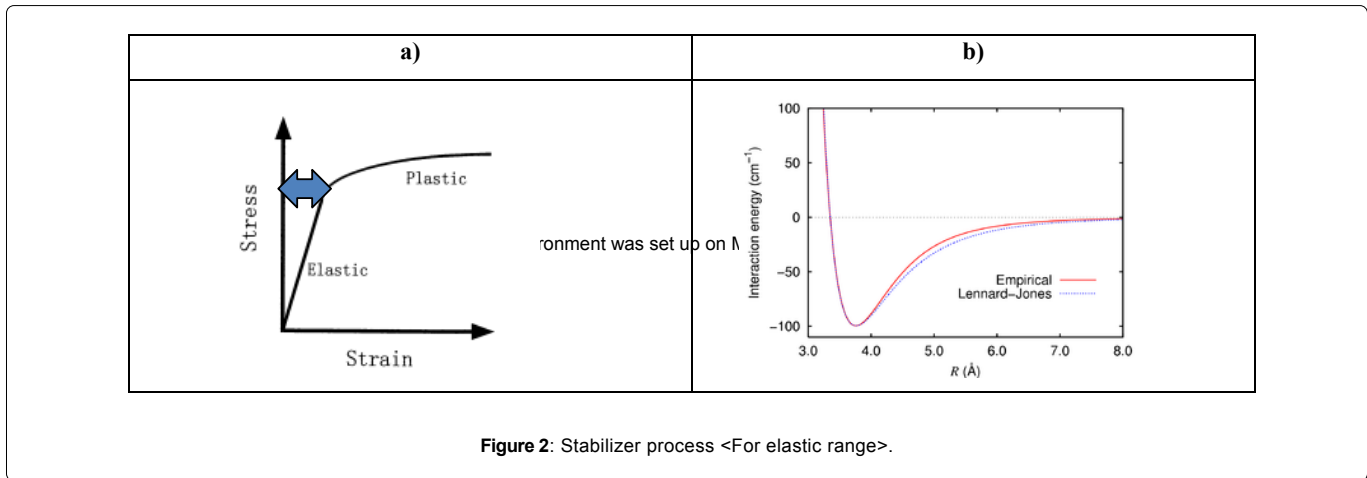


Figure 1: Simulation environment was set up on MS-DOS PC with MS-Fortran built in.

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In order to make the process flat, the key factors came from the measurement process in human basis, labor consumption process. Thus it is to propose embedded system application to be built in the products end up process which involved lightening measurement, evaluation for the life cycle (Figure 4).

Life cycle is always very important for the mass production of LED slight tips equipped with the whole IT infrastructure equipment such as the printer, copy machine. The sample graph above (Figure 2) shows exponential graph line axis to see applicability with possible equipment so then it is also important not only for the existing products Quality Control but also for the coming potential products.

The structure with proposing Embedded system application combined all labor measurement works in system showing on-time evaluation through reliability function, curve fit based upon Levenberg Marquardt Equation [4]. The imagination chart below includes all models of measurement, evaluation process in one system covering over 10 samples in simultaneous time line.

Case of SAW process management

In the Evaluation line with SAW, which covered vibration

absorption pieces, it is necessary to put several factors from measurement items into all products' quality process although it includes over 50 items to get evaluation item values from R&D knowledge, process views as well.

Also it could determine the material availabilities or former process eligibility which lead quite complicated decision making process. For this case one product in one visual chart to give intuitive decision criterion for mass production process itself. It is called "Data-Mining" process management that has been already transferred a lot into other areas, especially to East-Asian Areas from Japan. At that time, the author had struggled with the process not yet transferred to the outside over 10 years ago. And then, for further advances it has been applicable for molecular phenomena or quantum analysis with molecular science as well [5,6].

Case of Battery Management in Simple Sample Software

Battery is in increase to the mass production products with possible equipment including the infrastructure fields. Thus, test process should be built in mass scale and urgent process by automated programing methods.

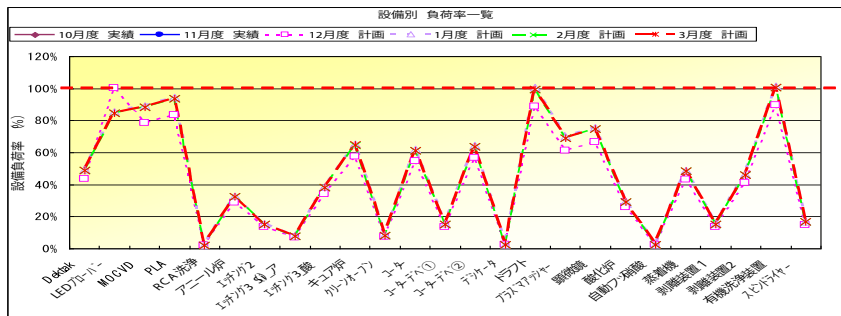


Figure 4: Productivity as per equipment line.

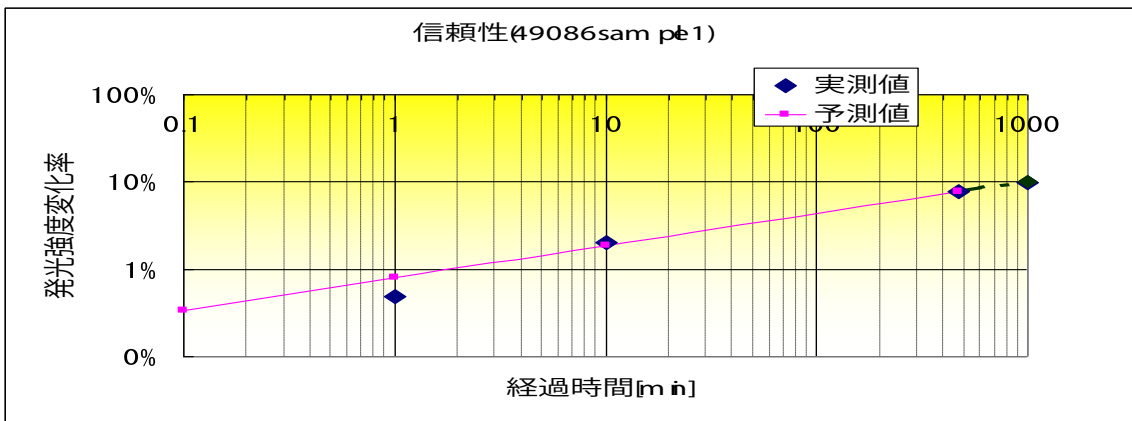


Figure 5: Lightened brightness level transition.

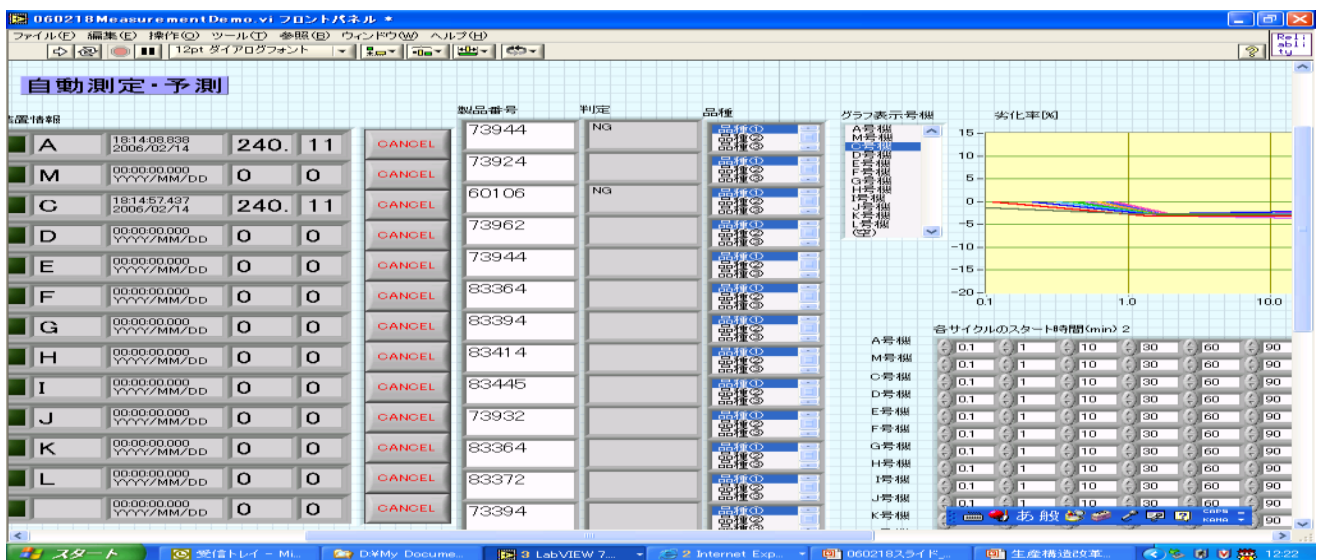
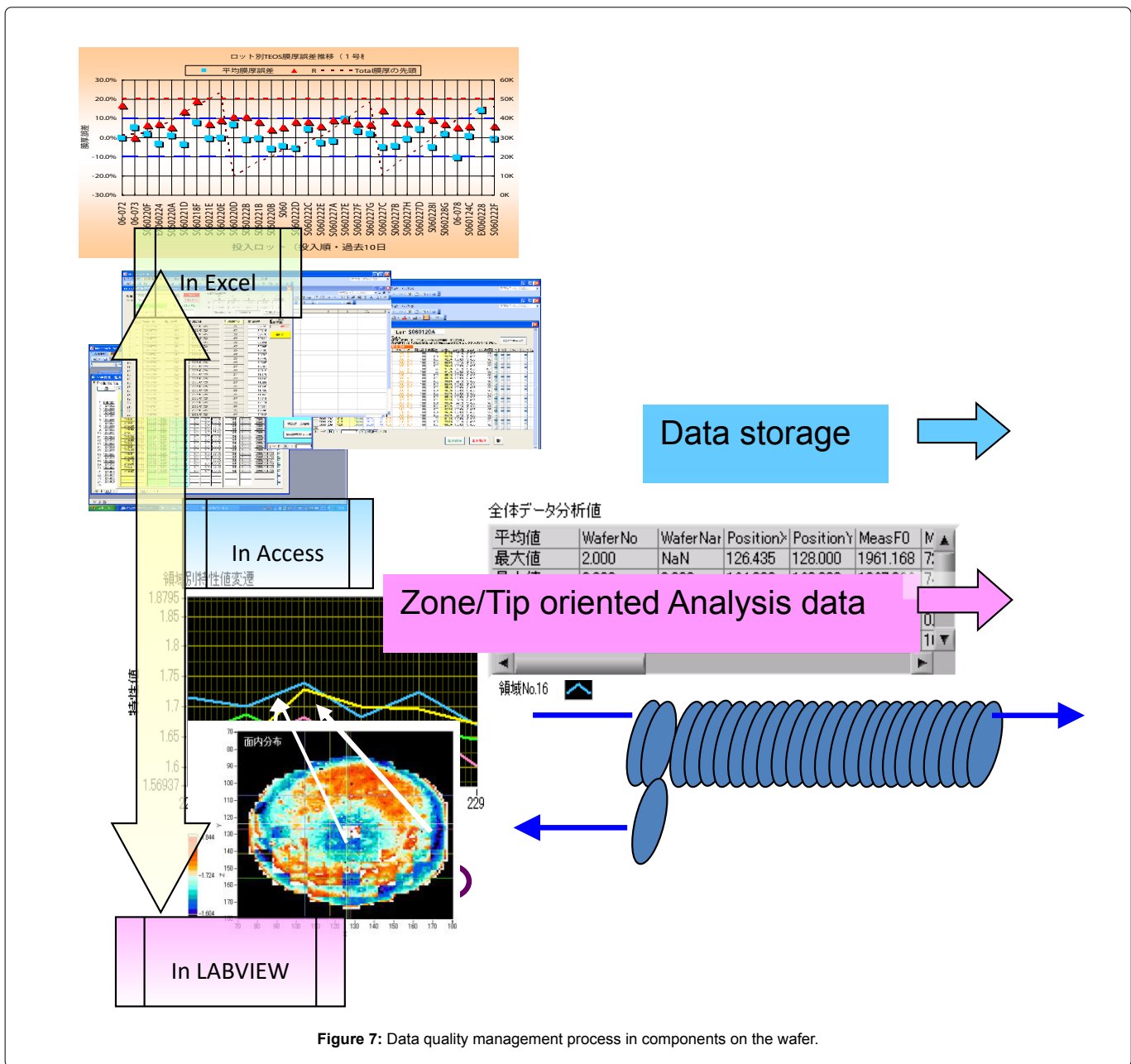


Figure 6: Picture by embedded system.



This is also the case with the solutions to so complex equations to describe the status of the battery in general cases.

Conclusion

It is always not easy to build up from the basis in technology since we have several industry fields, context in possible academic scenes. Sometimes too rapid application process for upcoming market can make confusion like small parts application while it is necessary to build up with the marketing mind-set to cover the potential markets as well.

This is the main reason to put description papers like this to state the past technologies also in IoT world going on.

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