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Institute of Mathematical Analysis (represented by H. Isshiki)

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Motto: We challenge risk boldly, deduce conclusion rapidly, create new business chance and contribute to revitalization of Japanese economy.

IMA (Institute of Mathematical Analysis) news is delivered every month. You can also download it from homepage (<http://www.hi-ho.ne.jp/issiki/>).

R & D in Our Institute: Robot and Underground GPS

When watching TV recently, humanoid robots developed by Honda and Sony are reported quite often. Their skill of walking on feet is making a steady progress. Many viewers with surprise and anticipation accept these robots. Especially in Japan, it overlaps with an image planted by a cartoon character robot “Astro-Boy” made by Osamu Tezuka. So, the general public without any doubts welcomes them.

Nothing may be said about the spread and coexistence with us in future. Undoubtedly, the robot technology in Japan is reaching maturity. Japanese may be very good at a technology such as robot. This kind of technology requires continuous improvement based on customers' voice. The traditional industrial robots are built in production systems, and they never appeared before general public. On the other hand, service robots that may spread from now on will have a big influence on our daily life. When robots evolve, events exceeding our imagination will happen. For example, a love between a man and robot. It exceed far beyond the homosexuality

In a robot society like this, the technology of Underground GPS may give a very important technological infrastructure for the correct behavior of robots. When the robot technology matures into a stage where they can process information in the same way as human beings, they can recognize their position from the same information as for human beings. However, it isn't an easy task, and it will take long. The technology of Underground GPS

may provide a significant means to estimate the position of a robot.

What should be done for the purpose? The most important thing may be cost down of the system. GPS technology seems expensive. On the contrary, a big cost down seems possible now because of the past technological accumulation.

Jobs in March

- (1) Proposal for practical use of an Underground GPS (Especially on signal sources)
- (2) Preparation for the demonstration of a high sensitivity GPS
- (3) Data analysis of a high precision GPS (Long baseline kinematic)
- (4) Basic study on modulation and demodulation of communication (Study on wavelet)

Schedule in and after April

- (1) Proposal for practical use of an Underground GPS
- (2) Works on practical use of a high sensitivity GPS
- (3) Data analysis of a high precision GPS (Long baseline kinematic)
- (4) Basic study on modulation and demodulation of communication (Software development of wavelet)
- (5) Submission of an abstract to ION GPS 2002 (Sept., Portland, Oregon)
<http://www.ion.org/meetings/meetings.cfm#gps>
- (6) Presentation of a paper on GPS Acoustics at UT2002 (April, Tokyo)
<http://underwater.iis.u-tokyo.ac.jp/ut02/Welcome.html>
- (7) Presentation of a paper at the Spring Meeting for the Society of Naval Architects of Japan
<http://www.snaj.or.jp>

Essay: Almost zero interest

The interest rate in Japan is now 0.0001%. Namely, the interest on one million yen for one year is only one yen. There is an opinion that this situation may be very hard to people living on interests and a remedy should be given to those people. The authors wonders whether this idea is correct or

not.

It is strange that the interest rate becomes minus. However, if it is plus, almost zero interest is possible from the theoretical point of view. The idea that the almost zero interest is impossible may be a kind of stereotype.

When the price falls on and the monetary value rises on, the value of deposit increases even if the interest is zero. If the price of all goods becomes half, the monetary value becomes double. Hence, if the one hundred yen is denominated as two hundred yen and the price of goods is doubled, both the face value and the monetary value become double. The benefit of pricing down becomes visible, but nothing does not change in its reality.

In case of people who live on interest, if the price becomes half, the half of their deposit has the same monetary value. Hence, the other half may be the interest. Since the real world is very complicated, this kind of simple reasoning may be dangerous. However, it may be correct as a whole.

The author thinks that our thinking is usually hemmed in very heavily. When we are bound to fixed ideas, a new idea does not come out. Those who have plenty of ideas may be people who are loosely bound to fixed ideas.

Link: <http://www.teruya.co.jp>