

**FINAL REPORT**  
**For Japan-Korea Joint Research Project**

AREA	①. Mathematics & Physics 2. Chemistry & Material Science 3. Biology 4. Informatics & Mechatronics 5. Geo-Science & Space Science 6. Medical Science 7. Humanities & Social Sciences
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**1. Research Title:**

Distance-regular graphs and spherical designs

**2. Term of Research:** From July 1, 2009 To June 30, 2011

**3. Total Budget**

a. Financial Support by JSPS: Total amount: 2,400 thousand yen

1<sup>st</sup> Year 900 thousand yen      2<sup>nd</sup> Year 1,200 thousand yen

3<sup>rd</sup> Year 300 thousand yen

b. Other Financial Support : Total amount: \_\_\_\_\_ thousand yen

**4. Project Organization**

<b>a. Japanese Principal Researcher</b>	
Name	Akihiro Munemasa
Institution / Department	Tohoku University / Graduate School of Information Sciences
Position	Professor
<b>b. Korean Principal Researcher</b>	
Name	Jacobus Hendricus Koolen
Institution / Department	Pohang University of Science and Technology/ Department of Mathematics
Position	Associate Professor

**c. List of Japanese-side Participants (Except for Principal Researcher)**

Name	Institution/Department	Position
<b>Tatsuro Ito</b>	Kanazawa University / Department of Computational Science	Professor
<b>Takao Komatsu</b>	Hirosaki University / Graduate School of Science	Professor
<b>Hiroshi Suzuki</b>	International Christian University / College of Liberal Arts	Professor
<b>Tetsuji Taniguchi</b>	Matsue Collete of Technology /	Assistant Professor
<b>Yoshio Sano</b>	National Institute of Informatics	Postdoctoral Fellow

**d. List of Korean-side Participants (Except for Principal Researcher)**

Name	Institution/Department	Position
<b>Jung Rae Cho</b>	<b>Pusan National University / Mathematics</b>	<b>Professor</b>
<b>Hyun Kwang Kim</b>	<b>Pohang University of Science and Technology / Mathematics</b>	<b>Professor</b>
<b>Mitsugu Hirasaka</b>	<b>Pusan National University / Mathematics</b>	<b>Associate Professor</b>

**5. Number of Exchanges during the Final Fiscal Year\***

**a. from Japan to Korea**

\*Japanese fiscal year begins April 1.

Name	Home Institution	Duration	Host Institution
Yoshio Sano	National Institute of Informatics	6-20 May, 2011	Pohang University of Science and Technology
For Final Fiscal Year(FY2011) Total: <u>  1  </u> persons		For Final Fiscal Year(FY2011) Total: <u>  15  </u> man-days	
Numbers of Exchanges during the past fiscal years			
FY2009: Total <u>  6  </u> persons			
FY2010: Total <u>  5  </u> persons			

**b. from Korea to Japan**

Name	Home Institution	Duration	Host Institution
Mitsugu Hirasaka	Pusan National University	22-27 April, 2011	Hirosaki University
For Final Fiscal Year(FY2011) Total: <u>  1  </u> persons		For Final Fiscal Year(FY2011) Total: <u>  6  </u> man-days	
Numbers of Exchanges during the past fiscal years			
FY2009: Total <u>  4  </u> persons			
FY2010: Total <u>  3  </u> persons			

## 6. Objective of Research

Our objective was to stimulate informal exchange of ideas related to the theory of distance-regular graphs and spherical designs to promote collaborative work by understanding each other's research interests and achievements. To achieve this goal, we regularly hold workshops on algebra and combinatorics, once in Japan and once in Korea.

Principal Researchers of both teams have long been working on algebraic graph theory, and it was through these workshop that we aim to find common problem to work, sometimes involving other members of the teams.

## 7. Methodology

We held workshops on algebra and combinatorics twice a year, once in Japan and once in Korea. All the members of both countries attended these workshops, and often they gave lectures. In this way, we understood each others' research interests and often resulted in discussion towards future joint projects.

However, in 2010, we expanded our usual workshop to a large international conference and held it in Gyeongju, Korea. All the members of both countries attended this conference, and especially, the Japanese principal researcher gave a plenary talk.

Every member in both countries has a right to recommend a speaker in the workshop. This system has an advantage to involve increasingly large number of researchers from both countries. Initially we knew only a few researchers in the other country, but after a series of workshops, we got to know many other people in the other country, not only in the member of the joint project.