

## In memory of Mirabbas Geogja oglu Gasymov on his 75th birthday

M. G. Gasymov was born on July 11, 1939 in Nari-mankend village (now Gobustan city) of Shamakhy district of Azerbaijan Republic. He grew up in a large family. His parents were ordinary people who had no education, but his father had a great reputation among the villagers. Mirabbas from his school years showed outstanding abilities in learning, especially in mathematics. His parents understood the need for series education of their son, and after finishing the school in 1956, M. G. Gasymov joined the Physics and Mathematics faculty of Azerbaijan State University (now Baku State University). In those years, the outstanding mathematician A. N. Kolmogorov took the initiative to transfer the most talented students from the Republics of the Soviet Union for studying at the Mechanics and Mathematics faculty of Moscow State University, being one of the most recognized centers in the world. M. G. Gasymov was among the chosen few transferred to M. V. Lomonosov MSU in 1958. Here he was one of the most talented students, and after graduating from MSU in 1961 he joined the post-graduate in speciality “Mathematics”.



In M. G. Gasymov’s student years his supervisor was the outstanding mathematician F. A. Berezin. The situation changed when in 1961 one of the founders of theory of inverse problems professor B. M. Levitan came to work at MSU. This theory became the main tool for exact integration of the Korteweg de Vries equation and many other equations of mathematical physics. The works in this field became one of the remarkable achievements of mathematics and physics of the twentieth century. Together with young, bright mathematician A. G. Kostyuchenko in the same 1961, at the Mechanics and Mathematics faculty of MGU Levitan opened a scientific-research seminar on spectral theory of operators. M. G. Gasymov began to attend this seminar, and after a short space he became one of the leading participants of this seminar. Levitan became his teacher and coauthor. Afterwards, Levitan repeatedly stated that Gasymov was his brightest and talented student.

In 1964 M. G. Gasymov defended his PhD thesis “Definition of Sturm-Liouville differential equation with respect to two spectra”. The results were published in the extensive work in “Uspekhi Matematicheskikh Nauk – Russian Mathematical Surveys” and were so bright that the Scientific Council of the Mechanics and Mathematics faculty of M. V. Lomonosov MSU adopted a special decision on the recognition of this dissertation “Remarkable”. After defence Gasymov was recruited as an assistant to prestigious Moscow Physical Technical Institute, and in 1965 he went to work as a senior lecturer to the Department Mathematics of F. E. Dzerzhinskiy Military Engineering Academy. At the same time, Gasymov

continues to be engaged in scientific work, publishes a lot of papers in leading mathematical journals, and in 1967 he represents and successfully defends the Doctoral dissertation “Some problems of theory of selfadjoint and non-selfadjoint differential operators” at Mechanics and Mathematics faculty of MSU. Later this dissertation was translated into English and published in the USA. The outstanding specialists A. G. Kostyuchenko, V. A. Marchenko and M. A. Naimark acted as official opponents.

After gaining the Doctor of Science degree in 1968, Gasymov moves to Baku and becomes a professor of Azerbaijan State University, where he worked till the end of his life. Here he organizes a scientific-research seminar that becomes a basis for mathematical school created by him and known far beyond Azerbaijan. In this seminar not only his students and mathematicians of Azerbaijan, but also specialists from all the Soviet Union have given talks. From 1972 Gasymov becomes the head of the Department Applied Mathematics of ASU and conducts multiform organizational work. At different years he was the head of Department Partial Differential Equations of the Institute of Mathematics and Mechanics of the Academy of Sciences of Azerbaijan, hold the post of the dean of Mechanics and Mathematics faculty and the dean of the new Applied Mathematics and Cybernetics faculty in whose organization he played the main role. He served as the first Deputy Minister of Education of the Republic, in 1990–1995 was elected a deputy of the Supreme Council of Azerbaijan. His scientific merits were evaluated: in 1980 Gasymov was elected a corresponding-member of the Academy of Sciences of Azerbaijan, in 1989 he became an active member (academician) of AS of Azerbaijan.

In 1990 Gasymov becomes the Rector of Baku State University. This was the hardest times when the powerful country – the Soviet Union was collapsing, its member republics gained their independence. In this new time the organization of scientific-pedagogical activity at the University required tremendous efforts. Gasymov was a talented organizer, but huge loads undermined his health. In 1992, after the stroke he resigned as rector. However, as he got recovered, together with his students he continued to be engaged in scientific researches.

Gasymov has published about 100 scientific papers that had left a deep trace in spectral theory of operators. The presence of original ideas, detection of unexpected connections was the characteristic feature of Gasymov’s papers. Most of all one can feel such a feature in his short publications (for instance, in “Doklady AN SSSR – Soviet Math. Dokl.”), where technical details have been omitted, but new statements and ideas gave fertile ground for readers-specialists.

The main results of Gasymov relate to inverse problems of spectral analysis for different classes of differential operators, to theory of non-selfadjoint operators with a continuous spectrum and relations of theory of operator of pencils with solvability of differential equations with operator coefficients. Among his papers on inverse problems, the complete solution of reconstruction of a potential on two spectra for the Sturm-Liouville equation on the finite interval obtained in collaboration with B. M. Levitan should be especially underlined (the first results on this problem were obtained by G. Borg and N. Levinson). The solution of the problem on reconstruction of a potential on two spectra for the Schrödinger equation on the semi-axis was even more difficult. When solving this problem, and also when

solving the inverse problem for the Dirac operator, Gasymov found absolutely new methods that had no analogues in literature. The papers of Gasymov on non-selfadjoint operators with a continuous spectrum were pioneering. In particular, he has solved a problem of decomposition by the solutions of the scattering theory problem for the Schrödinger non-selfadjoint operator with exponentially decreasing potential, investigated the principal part of the resolvent of the operator in the vicinity of spectral peculiarities. Appearance in 1951 M. V. Keldysh's paper on multiple completeness of eigenfunctions of operator pencils caused in subsequent years a wide resonance among specialists. In the course of investigations connected with this work the statement of a more difficult problem on multiple completeness and minimality of a part of eigenvectors of the pencil appeared. Gasymov understood relation of this problem with regular solvability for equations with operator coefficients and wrote a number of profound works on this topic.

It is impossible to tell in detail about the essence of Gasymov's all scientific investigations in a short article. We only note that his works were known and appreciated by operator theorists around the world, and he still is one of actively cited authors.

The most important result of Gasymov's activity is the mathematical school created by him in Azerbaijan. He was uncommonly talented Teacher. He has supervised 70 PhD and Doctor's degree dissertations.

Mirabbas Geogja oglu Gasymov passed away on September 6, 2008 in Baku, and by his own bequest he was buried in the cemetery of his native village Narimankend beside the graves of his father and mother.

The memory of Mirabbas Geogja oglu Gasymov will not fade in the hearts of all those who knew him.

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### **В память о Мираббасе Геогджа оглы Гасымове в связи с 75-летием**

М. Г. Гасымов родился 11 июля 1939 года в селении Нариманкенд (ныне город Гобустан) Шемахинского района Азербайджанской Республики. Он вырос в многодетной семье. Его родители были простыми людьми, не имевшими образования, но отец Мираббаса имел большой авторитет среди сельчан. Мираббас со школьных лет проявил незаурядные способности в учёбе, особенно в математике. Его родители понимали необходимость получения серьёзного образования сына, и после окончания школы в 1956 году М. Г. Гасымов поступает на физико-математический факультет Азербайджанского государственного университета (ныне Бакинский государственный университет). В те годы выдающийся математик А. Н. Колмогоров выступил с инициативой

перевода наиболее талантливых студентов университетов из республик Советского Союза для учёбы на механико-математическом факультете Московского государственного университета, являвшимся одним из наиболее признанных математических центров в мире. В числе немногих избранных Мираббас в 1958 году был переведён для учёбы в МГУ имени М. В. Ломоносова. Здесь он также оказался одним из наиболее талантливых студентов и после окончания МГУ в 1961 году по специальности «математика» был оставлен в аспирантуре.

Научным руководителем Мираббаса в студенческие годы был выдающийся математик Ф. А. Березин. Ситуация изменилась, когда в 1961 году в МГУ перешёл работать профессор Б. М. Левитан, один из основоположников теории обратных задач. Эта теория оказалась основным инструментом для точного интегрирования уравнения Кортевега де Фриза и многих других уравнений математической физики. Работы в этой области явились одним из наиболее замечательных достижений математики и физики 20-го столетия. Вместе с молодым, ярким математиком А. Г. Костюченко в том же 1961 году Левитан открыл на механико-математическом факультете МГУ научно-исследовательский семинар по спектральной теории операторов. Гасымов начал посещать этот семинар и вскоре стал одним из ведущих его участников. Левитан стал его учителем и соавтором. Впоследствии Левитан неоднократно высказывал, что Гасымов был наиболее ярким и талантливым его учеником.

В 1964 году М. Г. Гасымов защитил кандидатскую диссертацию «Определение дифференциального уравнения Штурма-Лиувилля по двум спектрам». Результаты были опубликованы в обширной работе в «Успехах математических наук» и были столь яркими, что на Учёном Совете механико-математического факультета МГУ им. М. В. Ломоносова было принято специальное решение о признании этой диссертации «Выдающейся». После защиты Гасымов был принят на работу ассистентом в престижный Московский физико-технический институт, а в 1965 году перешёл на работу старшим преподавателем на кафедру математики Военно-инженерной академии им. Ф. Э. Дзержинского. Одновременно Гасымов продолжает активно заниматься научной работой, публикует в ведущих математических журналах много статей, и уже в 1967 году представляет и успешно защищает на механико-математическом факультете в МГУ докторскую диссертацию «Некоторые вопросы теории самосопряжённых и несамосопряжённых дифференциальных операторов». Позже эта диссертация была переведена на английский язык и была издана в США. Официальными оппонентами выступили выдающиеся специалисты А. Г. Костюченко, В. А. Марченко и М. А. Наймарк.

После утверждения докторской диссертации в 1968 году Гасымов переезжает в Баку и становится профессором Азербайджанского государственного университета, где проработал остальные годы своей жизни. Здесь он организует научно-исследовательский семинар, который становится базой для созданной им известной далеко за пределами Азербайджана математической школы. С докладами на семинаре выступали не только его ученики и математики Азербайджана, но и специалисты со всего Советского Союза. С 1972 года Гасымов становится заведующим кафедрой прикладной математики АГУ и ведёт многообразную научно-организационную работу. В разные

годы он являлся заведующим отдела дифференциальных уравнений в частных производных Института Математики и Механики АН Азербайджана, занимал должности декана механико-математического факультета и декана нового факультета прикладной математики и кибернетики, в организации которого он сыграл основную роль. Он занимал также пост первого заместителя министра образования республики, в 1990–95 годах избирался депутатом Верховного Совета Азербайджана. Научные заслуги были оценены: в 1980 году Гасымов был избран членом-корреспондентом АН Азербайджана, а в 1989 году стал действительным членом (академиком) АН Азербайджана.

В 1990 году Гасымов становится ректором Бакинского государственного университета. Это было труднейшее время, когда могучая страна – Советский Союз терпела крушение, а входящие в её состав республики приобретали независимость. Организация научно-педагогической деятельности в университете требовала в это новое время невероятных усилий. Гасымов оказался талантливым организатором, но огромные нагрузки подорвали его здоровье. В 1992 году после перенесенного инсульта он оставил пост ректора. Однако впоследствии, по мере выздоровления Гасымов вместе с учениками продолжал активно заниматься научными исследованиями.

Гасымов опубликовал около 100 научных работ, которые оставили глубокий след в спектральной теории операторов. Характерной особенностью работ Гасымова являлось присутствие в них новых оригинальных идей, обнаружение новых неожиданных связей. Такую особенность более всего можно ощутить в его коротких публикациях (например, в «Докладах АН СССР»), где технические детали опускались, но новые постановки и идеи давали плодотворную почву для читателей-специалистов.

Основные результаты Гасымова относятся к обратным задачам спектрального анализа для различных классов дифференциальных операторов, к теории несамосопряжённых операторов с непрерывным спектром и связи теории пучков операторов с разрешимостью дифференциальных уравнений с операторными коэффициентами. В цикле его работ по обратным задачам следует выделить полученное совместно с Б. М. Левитаном полное решение задачи восстановления потенциала по двум спектрам для уравнения Штурма-Лиувилля на конечном отрезке (первые замечательные результаты по этой задаче были получены Г. Боргом и Н. Левинсоном). Еще более трудным явилось решение задачи восстановления потенциала по двум спектрам для уравнения Шредингера на полуоси. При решении этой задачи, а также при решении обратной задачи для оператора Дирака Гасымов нашёл абсолютно новые подходы, аналогов которых в литературе не было. Пионерскими явились работы Гасымова по несамосопряжённым операторам с непрерывным спектром. В частности, им была решена проблема разложения по решениям задачи теории рассеяния для несамосопряжённого оператора Шредингера с экспоненциально убывающим потенциалом, исследована главная часть резольвенты оператора в окрестности спектральных особенностей. Появление в 1951 году работы М. В. Келдыша о кратной полноте собственных функций пучков операторов вызвала в последующие годы широкий резонанс среди специалистов. В ходе исследований, связанных с этой работой, возникла постановка более трудной задачи о кратной полноте и минимальности части

собственных векторов пучка. Гасымов понял связь этой задачи с проблемой регулярной разрешимости для уравнений с операторными коэффициентами и написал на эту тему серию глубоких работ.

В короткой заметке невозможно более подробно сказать о сути всех научных исследований Гасымова. Отметим лишь, что его работы знали и ценили специалисты по теории операторов во всём мире, он и поныне остаётся одним из активно цитируемых авторов.

Важнейшим результатом деятельности Гасымова является созданная им в Азербайджане математическая школа. Он оказался необыкновенно талантливым Учителем. Под его руководством защищены 70 кандидатских и докторских диссертаций.

Мираббас Геогджа оглы Гасымов скончался 6 сентября 2008 года в городе Баку и по собственному завещанию похоронен на кладбище родного села Нариманкенд рядом с могилами отца и матери.

Память о Мираббасе Геогджа оглы Гасымове не угаснет в сердцах всех тех, кто его знал.

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М. Дж. Марданов, В. А. Марченко, С. С. Мирзоев, Г. Д. Оруджев,  
Э. Г. Оруджев, М. О. Отелбаев, Л. А. Пастур,  
Ф. С. Рофе-Бекетов, В. А. Садовничий, А. А. Шкалик*

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