

Red de Cátedras de Empresas Tecnológicas



English edition

Telefonica

HiDROGEA

ODILO

سابك
sabic

UFORRES

AICL Specialty
Fertilizers
Fuentes

Grupo
G's España

indra

Santander

INFO



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A specialized, innovative and urban Network

The Network of Chairs sponsored by Technology Companies of the Universidad Politécnica de Cartagena (UPCT) is a space for the collaboration between this university and technology companies whose purpose is to conduct training, research and development or the transfer of knowledge in areas of common interest. It emerges as a tool to strengthen the relationship between universities and technology companies, at the local, national and multinational levels.

The activities developed by the Network include scholarship and R&D programs, collaboration with training programs from UPCT Schools and Faculties, the promotion of internships among students, the endorsement and organization of conferences and dissemination events and the call for awards.

All chairs are located within the Chairs Network Space at

Gathering all chairs under one roof is a novelty concept in Spanish university

the Innovation Labs Building (ELDI). It is a site with common areas for meetings and recreation, which generates a work environment conducive to interaction and innovation. This concept of unification of all chairs under one roof and organization is completely new for Spanish universities, where every chair usually operates independently of others.

The "Network of Chairs" approach not only fosters the association between our university and the business world and tries to achieve productive and employability outcomes, but it also encourages partnerships between the different chairs, which fulfill goals of a broader scope, such as the development of long-term multidisciplinary projects or the participation in national or European project consortia.

Technology transfer

The Chairs Network tackles

one of the main problems of Spain's industry: limited technology transfer between academia and companies. Thus, the Network emerges as an instrument to strengthen the relationship between the UPCT and technology companies at the local, national or multinational levels.

Cooperation agreements between the Universidad Politécnica and companies affiliated to the Network facilitate the counseling of companies in R&D matters, providing preferential information on projects developed by the UPCT, while also fostering the design of training and specialization courses for company staff and the development of research, training, and technology-and-knowledge-transfer projects. Other objectives involved are the counseling on the search for professionals and technologies, the supply of human capital from senior student or recent graduate bodies; and the institutional and media promotion of companies.

Nine chairs have recently been incorporated to the Network. Telefónica, Odilo, MTorres, Indra, G's Spain, and Banco Santander are already developing their projects in the UPCT ELDI building. Hidrogea, Sabic and Fuentes Fertilizers will be added in the coming weeks.

In addition, there are new projects on the table which are being put forward for UPCT-company collaboration.



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INNOVAR

Promoting talent

Telefónica is one of the world's leading integrated telecommunications operators in providing solutions for communication, information and entertainment, with a presence in Europe and Latin America. It is present in 24 countries and has a customer base exceeding 313.1 million, as of March 2014.

The Telefónica-UPCT Chair, directed by Rafael Toledo, provides 10 scholarships within the Talentum Startups Short Tracks program 'Your own project' by Telefónica. Scholarships, which last 6 months part-time, allowing engineering students selected by Telefónica to conduct their own projects in collaboration with the UPCT Office of Entrepreneurs and Technology Based Firms.

The Chair brings other advantages for the UPCT and Telefónica, such as the inclusion of the UPCT in the list of institutions that collaborate with Telefónica on tours and events related to technology, innovation and social entrepreneurship, and offers possibility for UPCT students to carry out internships at Telefónica, among other agreements.

Talentum Startups

With Talentum, Telefónica seeks to promote young and innovative university talent, opening appropriate doors for this generation, providing them with the tools and support they need to feel encouraged and participate in the creation of a new European digital world. Grantee students of the Telefónica-UPCT chair participated in the first edition



of this contest, competing in the development of innovative applications. Students Jorge Mendoza Saucedo and José Carlos Izquierdo Carrasco have been selected by the company to compete in the final phase of its Talentum Startups program.

Jorge Mendoza's app, 'MedicRA', controls the user's health, managing his treatments, diagnostics, medical records and medication. This Telematic Engineering student already won last year's

Students Jorge Mendoza and Jose Carlos Izquierdo were finalists in 'Talentum Startups'

Vodafone-UPCT Apps competition. Telecommunications Engineering student José Carlos Izquierdo's Development of 'Controltooth' works as a remote control for computer applications, allowing users to operate their programs from a single remote control.

The projects of the rest of the Telefónica-UPCT Chair grantees were: a smartphone-controlled zeppelin for streaming and taking photographs from large-scale



UPCT Students who received a grant through the Telefónica Chair participating in work sessions taking place at ELDI.



events; an automated camera to perform the 'time lapse' technique; a navigator to optimize road transport; an entertainment guide promoting sustainable businesses; a device that centralizes the control of home electronics and a smartphone program that informs of the availability of services according to the user's interests.

Summary: Students Jorge Mendoza and Jose Carlos Izquierdo were finalists in 'Talentum Startups'.





Innovating with words

Odilo is a company born in Cartagena, but with a broad international scope. Its present in Europe and across the Atlantic, with premises in the United States. In the field of business management software, it carries out marketing, research and development activities.

As part of the Network of Chairs, Odilo funds two scholarships oriented towards innovation in systems for access to digital content and document management in libraries, fields where Odilo is leading. Scholarships are also aimed at providing specific highly-qualified training.

The company's goal is to eventually hire the grantees trained through the chair's funding. For UPCT, this is an excellent way to strengthen relationships with the industry and offer professional

The Odilo-UPCT chair is developing the technology to digitize the USA State of Colorado's library network

opportunities for its graduates.

Libraries in USA

At present, the Odilo-UPCT Chair, directed by Juan Ángel Pastor, is developing the technological support needed to digitize the network of state libraries in the state of Colorado (USA). Engineers trained at the Politécnica who are part of Odilo's chair are currently performing projects concerning books in the Cloud and virtual access to 'e-books', audio, video and publisher's lists. 70% of the company's workforce is engaged in R&D.

In addition, the Michigan Library Network (TLN), a cooperative of public libraries gathering 65 libraries from Michigan, has recently signed a three-year agreement with Odilo to use the company's software and services





The two Odilo-UPCT chair grantees, working on company projects. In the picture above, the signing of the agreement between Odilo and the Universidad Politécnica.



in their libraries. The project was initially launched by 30 member libraries, with plans to gradually expand service to more libraries.

The platform seeks to diversify and strengthen the availability of digital content to users of member libraries. Agreements have already been signed with the big publishing houses of the US, as well as with smaller publishers, independent publishers and local authors, servicing all existing content providers.

This partnership ensures that TLN member libraries will continue to be leaders in the supply of digital content to their customers. The elec-

tronic content management platform created by the Odilo company is ideal for public libraries and agencies since it can integrate whole library collections under a new completely digital platform and in the Cloud.

Digital content (e-books, audio and video) is becoming increasingly important under this new platform, as also is new self-published content; e.g., in the case of a university, books or materials by teachers and students' work.

Another one of Odilo's products is 'OdiloPlace', an online store loaning digital content, which comprises materials from more than 200 publishers worldwide.

Technology for the future

MTorres was conceived and developed as an industrial group specialized in advanced technologies to develop innovative solutions for the automation of highly complex industrial processes: it designs, develops and manufactures automation systems for industrial processes in sectors related to paper converting; tooling, assembly and machines for the aeronautic and aerospace sector, composite materials and renewable energy.

The MTorres-UPCT Chair, led by Francisco Cavas, operates in areas related to the technologies with which the company works, specifically focusing on the development of computer vision techniques and robotics developments.

After a thorough selection process involving more than 100 candidates, three scholarships for UPCT students were offered and awarded.

The Chair is also engaged in other training and prize sponsorship activities, such as the award for the Best Final Degree Project of the School of Industrial Engineering presenting the most innovative solution (a scholarship with MTorres + 1000 € in cash), which will be handed over during the Academic Ceremony of Saint Thomas Aquinas.

Through the Chair, the company expands its strategy of

attracting new talent from the Region of Murcia towards its organization. 90% of engineers working at the MTorres premises in Fuente Alamo studied at the Universidad Politécnica de Cartagena. The MTorres group employs over five hundred people at its ten sites spread throughout the world, from which it supplies more than seventy countries with products and services that are at the leading edge of the design and manufacture of aircraft components, printing machinery and wind farms.

Teaching support

In the agreement signed in January 2014, it was established that the Chair would also support undergraduate and graduate activities, conducting and sponsoring in-house courses and seminars, co-designing the training plans of the company and encouraging the monitoring of final degree projects.

Last June, as a token of commitment, the technical director of Airbus Defence and Space, Vicente Gómez Molinero, visited the facilities of the MTorres Chair and met his grantees.

During the visit, there was a presentation of the R&D activities currently developed by the MTorres Group by students within the Chair, highlighting the capabilities of the MTorres robot to perform machining operations on curved surfaces.



The Chair sponsors the prize for the best Final Degree Project from the School of Industrial Engineering





Pictures of the last few months of developments by the M-Torres-UPCT Chair, from its headquarters at the ELDI; signing of the agreement between the Chancellor of the UPCT, José Antonio Franco, and the founding-president of the company, Manuel Torres; the grantee selection process; and work coordinated by students and instructors from the Chair.

Efficiency as a goal



Indra and the Universidad Politécnica de Cartagena strengthen their collaboration through the creation of the Indra-UPCT Chair, which aims to conduct research, technological development, training and dissemination in the field of health technologies and smart cities. Thanks to the Chair, UPCT students carry out internships at the # 1 technology and consulting multinational company in Spain and one of the largest in Europe and Latin America.

The Chair combines the knowledge and experience of both organizations regarding cooperative R&D development. The agreement also envisages carrying out studies on communication technologies, the security of information transmission in hospital settings, plus re-



The images show the headquarters of the Indra-UPCT Chair, where two of its grantees are already working; moments of the selection process, which involved a dozen students of the Politécnica; the signing of the agreement between the University and the company; the prize winners on 'Telecommunications Night'; among them, Fernando Cerdán.

search on sensor networks and the automated planning of processes and services, in order to improve the efficiency and sustainability of urban infrastructures in the context of smart cities.

The Indra-UPCT Chair also aims at training students and researchers, conducting courses and internships for students from the Politécnica at the multinational, which yearly offers two ten-month scholarships.

Besides, the Chair awards a prize for Best Final Degree Project conducted at the School of Telecommu-

Indra collaborates with over 250 innovation and knowledge institutions and sponsors 20 chairs

nications Engineering, from among those addressing issues involving the Chair's areas of interest.

Within an open innovation framework model, Indra collaborates with over 250 institutions in the innovation and knowledge field, has agreements with more than 180 universities and research centers (57 of them abroad), and currently sponsors 20 university Chairs. Through this collaboration, the company maintains its commitment to innovation, recruits highly-qualified professionals and has access to the latest technologies. The two

grantees who are currently working for the Chair will have the opportunity to join the staff of the company after finishing their internship, if they meet the company's expectations.

The Chair's director, Professor Fernando Cerdán Cartagena, was recently awarded 'Teleco of the Year 2014', by the Association of Telecommunications Engineers of the Region of Murcia. At the gala where he was awarded this prize, Odilo also received an award for its entrepreneurial strategy, whereas Indra was commissioned to deliver one of the prizes.



G's Spain Group and the Universidad Politécnica de Cartagena work together on the G's Spain-UPCT Research Chair, which aims to conduct research and technological developments, training and dissemination in the agricultural food sector in all its processing phases.

G's Spain Group is a modern, dynamic and profitable company, one of the European leaders in the production and marketing of a wide range of fresh fruit and vegetables, and its headquartered in Torre Pacheco, which opens up the possibility to manufacture 52 weeks a year.

Founded in 1985, it is a subsidiary of the G's Group, an international company established in the UK in 1952. Its 4,000 hectares of crops in Spain are distributed in the Cartagena Council, Águilas, Jumilla, and in the provinces of Granada, Albacete and Alicante. The group also has offices in the UK, Czech Republic, Senegal and the United States.

Under this Chair, UPCT students conduct their research astride the company and the university, bringing together the knowledge and expertise of both organizations in the joint development of R&D activities. The training of students and researchers is another objective pursued by the G's Spain-UPCT Chair, which will be achieved through courses and internships at the company by students from the School of Agricultural Engineering (ETSIA).

G's Spain Group yearly offers two ten-month scholarships for Agricultural Engineering Master's Degree or Doctorate students, with an option to be hired by the company after that training period.

In addition, the Chair offers a Prize for Best Final Degree/Master's Project carried out at the Agricultural Engineering School, from among those addressing issues within the areas of interest of the Chair.

The scholarships, which began in September, last ten months and offer a part-time



Leading commitment to R&D

G's Spain offers ten-month scholarship to two students from the School of Agricultural Engineering, with an option to incorporate them into the staff

schedule, with a gross monthly salary of 600 €.

The company has searched for agricultural researcher profiles in the fields of post-harvest and plant production. Juan Luis Pedreño, UPCT Vice-President and Head of the Network of Chairs, stresses the company's commitment to incorporate graduates from the Politécnica. "All candidates who participate in the selection have experience as researchers. 80% have completed the Master's in Advanced Research Techniques at the School of Agricultural Engineering and several of them are already doctors by the UPCT", indicates Francisco Artés Hernández, director of the Chair.

The offer is both interesting to students in grades taught at the School of Agricultural Engineering and to employees, who see a scholarship as an opportunity to revamp their careers towards research.



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Both G's Spain-UPCT chair grantees, working on company projects. In the picture below, the signing of the agreement between G's Spain and the Universidad Politécnica. The two photographs on the side show the selection process of grantees and Francisco Artés, director of the Chair.



San

The best support to entrepreneurs

Banco Santander, through its Santander Universities program, and the Universidad Politécnica de Cartagena (UPCT), through its Office for Entrepreneurs and Technology Based Firms, have joined forces to create the Banco Santander-UPCT Chair for Entrepreneurship.

The collaboration between one of the financial institutions with more international exposure and the UPCT is key to fostering entrepreneurship within the university community and thus for the generation of new innovative projects, taking advantage of the various synergies that

The Chair aims to be a key element for the promotion of entrepreneurship within the university community

materialize in the framework of a technical university as UPCT. The goal of this Chair, directed by Juan Monzó and Domingo García, is to promote entrepreneurial spirit and attitudes, supporting entrepreneurial initiatives and the creation of new business projects in Spain.

Another one of the initiatives promoted by Banco Santander's Entrepreneurship Chair is a scholarship offered in support of UPCT students' activities during academic year 2014-2015.

This scholarship is aimed at complementing the aca-





The headquarters of the Banco Santander-UPCT Chair, Mario Rosique, Juan Monzón y Domingo García Pérez de Lema, with Pedro Requena Gómez. Other pictures show the signing of the agreement between Banco Santander Foundation and the Universidad Politécnica.



demetic training of recipients engaged in the field of entrepreneurship and innovation, developing activities to assist the Chair's everyday work, applying the various existing methodologies in the field of university company creation.

The Chair also envisages developing research programs related to the study of entrepreneurship and business creation; the promotion and publication of monographs on the subjects studied by the Chair; cultural development and the dissemination of teaching and research activities, e.g. awards; as well as the advancement of entrepreneurship and the creation of businesses in the area.



Synergy that flows

The Hidrogea Gestión Integral de Aguas de Murcia S.A.-UPCT corporate-sponsored chair has been created to collaborate in the training of students, to offer them internships in the management of the urban water cycle, and mostly in order to promote research and development of technologies related to the integrated water cycle and their possible applications in 'smart cities'. Participation will be encouraged in R&D projects related to the smart management of the integrated water cycle and information technology.

The agreement regulates the collaboration of the Universidad Politécnica de Cartagena in Hidrogea's R&D programs. Hidrogea and ESAMUR are jointly investigating odor suppression in the sewage system of La Manga (Cartagena).

With the addition of Hidrogea, the UPCT Network of Chairs of technology-based Companies enhances the current employment opportunities of students.

The integral water management company will offer three ten-month research grants and agrees to eventually hire UPCT students afterwards.

Each year, a dozen students from the Politécnica will carry out an internship at Hidrogea. The company will also

Hidrogea and the UPCT promote the smart management of the integrated water cycle and its applications in 'smart cities'

offer a Final Degree Award to students from the Schools of Civil, Mining and Industrial Engineering.

"The agreement promotes applied research in fields such as hydraulic and sewage engineering and gives students the opportunity to continue their practical training and approach the working world in a supervised manner" stresses Juan García Bermejo, the professor who conducts the Chair.

Hidrogea also contributes to UPCT students' training, through the organization of training programs with workshops, seminars and postgraduate courses.





: Pictures of the Hidrogea-UPCT Chair facilities located in the ELDI building, during the visit of Javier Ybarra, Hidrogea Concessions Director, and the Secretary General for Agriculture and Water, Francisco Moreno, on the same day that the partnership was sealed.





Multinational experience

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Sabic, the world's leader in the manufacture of chemicals, fertilizers, plastics and metals, is one of the newest additions to the Network of Chairs of the Universidad Politécnica de Cartagena.

This is the culmination of a mutual collaboration committed to research and talent scouting from the university environment. The Sabic-UPCT Chair aims at sharing research resources, and at offering training and internships in the field of the optimization of plastic processes.

Researchers from the Universidad Politécnica de Carta-

gena collaborate with Sabic in technological projects to model internal reactions within the production process and to reduce the amount of waste dumped in the sea.

Studies on chemical reactions, minimization of water evaporation and risk model validation will also be performed. The company will provide financing for R&D tasks, whereas the UPCT will supply its research groups, equipment and facilities.

On the other hand, the Chair, directed by Francisco José Hernández, supports academic activities involved in undergraduate and gradua-

The Chair aims to share resources for research and training in the area of the optimization of plastic processes

te courses, but also in-home courses and seminars, sponsoring them, collaborating in the training plans of the company and promoting the monitoring of final degree projects.

Specifically, Sabic pledges itself to provide personnel and resources to conduct a training course for students and researchers.

The company also focuses on training professionals in their own facilities with the financing of three 10-month part-time grants and has pledged to hire a UPCT graduate from the domain of the Chair for a period of at least a whole year.



Hector Puyosa, Sabic's Technical Department director, emphasized "Sabic's commitment to ensure the best training to its workers and to UPCT students."

This Chair will also boost our long cooperation record with the University, through courses, internships and having our company's professionals teaching in different university degrees."

An award for Best Final Degree Project will also be offered within the Industrial Engineering School and dissemination activities will be sponsored.



Pictures from the presentation of the paid-internship program for Industrial Engineering students from the Sabic-UPCT Chair. In the picture above, the director of the School of Industrial Engineering, Antonio Guillamón; the Chancellor of the UPCT, José Antonio Franco; the CEO of Sabic in Cartagena, Theo van Eldik; the technical management director, Hector Puyosa; and the Director-General for Universities, Luis Javier Lozano; signing the agreement for the establishment of the Chair.

A new concept of agriculture



Another one of the most recent additions to the Network of Chairs of the Universidad Politécnica de Cartagena is the ICL Fuentes Fertilizantes company. This company, a multinational fertilizer and chemical firm, is Spain's largest manufacturer of specialized fertilizers.

The Chair aims to achieve a more productive and sustainable agriculture and to encourage entrepreneurship, supporting entrepreneurial initiatives and generating new business projects.

Alongside G's Spain, it is the second agricultural company that joins the Network of Technology Chairs launched by the Universidad Politécnica de Cartagena. The director of the UPCT School of Agricultural Engineering, and head of the Chair, Alejandro Pérez Pastor, highlighted that research programs in plant production will be developed, and proposed the creation of an internationally oriented master's degree in fertigation, which means calculating the irrigation needs of any plant.

Likewise, the Chair will organize training activities, seminars, conferences, workshops and forums, and will advance research programs. It also aims at promoting the publication of monographs on fertilizing techniques, and at fostering new research groups specializing in sustainable agriculture, among other objectives.

Internships

Pérez Pastor recalled that the UPCT has held a good rapport with this company for many years. Examples of this are the fact that its Technical Director was a student of the University, and the company also routinely hosts UPCT interns. Currently, the degrees offered by the School of Agricultural Engineering include internships and Fuentes Fertilizantes will be one of the companies offering them, for which students will receive a wage. Through this Chair, the UPCT will also seek funding for Final Degree Projects related to crop production.



In the picture above, the signing of the agreement establishing the IDL Fuentes Fertilizantes-UPCT Chair. The rest of the images show the facilities of the Politécnica University in which the research of the Chair will be developed.

Research programs in the fields of vegetable production and fertigation will be developed





Juan Luis Pedreño

UPCT Vice-President for Information and Communications Technology

«This network is a pioneering concept in Spain»

As Vice-President for Information and Communications Technology, Juan Luis Pedreño (Cartagena, 1969) experienced firsthand the planning stages and the dazzling launch of the UPCT Network of Chairs sponsored by Technology Companies. In recent years, his office has supported the creation of a pioneering Network of Chairs, efficient and above all effective -at a qualitative and quantitative level- for both the UPCT and the participating companies.

How did the UPCT Network of Chairs sponsored by Technology Companies come into being?

It is important that the collaboration with companies results in technology transfer and in commitment to the experience of R&D groups and University students, and that it all leads to fruitful developments. In that sense, the UPCT's technological expertise is an advantage to be seized, since it comprises the main engineering areas developed in Spain.

Is it an example comparable to other networks of chairs?

The model of chairs in other regions is not based on collaboration agreements that require project development performance (or results) furthering innovation within companies themselves. With the goal of changing this collaboration model, we decided to offer multinational companies -or those with a capacity for growth and sufficient renown- a space in our very Campus, where they may invest in our core assets: the best R&D groups, students and laboratory equipment.

What activities are carried out by the chairs?

Each chair designs its own line of action according to its expectations and the specific capacity of each research group related to the required technology.

Broad strategic lines must integrate work within each chair into the goals set by the management of the companies in each period. The lines that are currently being developed include many of the engineering fields studied at UPCT—mainly, Telecommunications, Industrial, Civil or Agricultural Engineering - which are dedicated to fields such as energy efficiency, smart cities, quality in agri-food products, innovation in aeronautical processes, development and processing of new materials, ICT in the health sector, entrepreneurship, water management, digital libraries or fiber optics technologies, among others.

Has it attracted the general attention of companies?

The initial process was not as fast as we would have liked it to be, but we must take into account the absence of legislation and agreement forms, and procedures like the hiring of interns and the selection of chair directors, as well as other aspects related to location and design of the spaces of the network of Chairs, the first phase of which is based at the ELDI building on the Muralla del Mar Campus. The attention arises mainly from the fact that this is a pioneering concept in Spain and we have tried to implement it with the maxi-



«The chairs have a huge interest in recruiting the best students and recent graduates»

mum efficiency within a field of the public administration.

Were the initial expectations fulfilled?

The project was initially designed for a network of six technology chairs and just a few months after making it known to the companies, we had to expand the project to incorporate companies that we believe are in line with what we want the network of Chairs of technology companies to become. Eleven chairs have already been filled and we are practically ready to incorporate five or six more, which will be announced as agreements are signed.

How does the UPCT benefit from it?

One of the current goals of University these days -and even more so in the technical field- is undoubtedly to train the best students so that they achieve the highest degree of recognition among the most important



companies. An indicator that measures the fulfillment of this goal would certainly be the interest on the side of the chairs to hire the best students and/or recent graduates. That is our main asset. The economic impact, however, can be measured by the investment made by each company in its chairs, but even more important is the development of joint projects with our R&D groups.

What are the benefits of sharing the building and common spaces?

The appeal for companies under this model is to consider the chairs as a network of companies coordinated by the university, creating synergies among all of them, therefore increasing the number of individual company projects and activities, and also of joint initiatives.

What synergies will be generated by locating the network in a building destined to teaching and research?

On the one hand, the support of R&D groups, and on the other, the amalgamation of companies' interests within these groups, which fosters joint applications for national or European projects, from companies that provide chair members who are highly qualified and very experienced in the implementation of technology projects.

What does the Network of Chairs mean to the university district?

The close proximity to the university district is a factor that must be taken advantage of. Universities must be physically close to their students in order to consolidate themselves and become a reference for all kinds of social and economic agents. The urban enclave of the UPCT campus can greatly contribute to that kind of feedback. Our university is working towards establishing the university district as a center of academic and research activity and investment.



$$\frac{M}{dy} = \frac{(3x^2y - 4xy^3 + 6x)dx + (x^3 - 6x^2y^2 - 1)dy}{dy} = 3x^2 - 12xy^2$$

$$\frac{dN}{dx} = \frac{(3x^2y - 4xy^3 + 6x)dx + (x^3 - 6x^2y^2 - 1)dy}{dx} = 3x^2 - 12xy^2$$

$$(3x^2y - 4xy^3 + 6x)dx = x^3y - 2xy^3 + 3x^2$$

$$(x^3 - 6x^2y^2 - 1)dy = x^3y - 2x^2y^3 - y$$

$$x^3y - 2x^2y^3 + 3x^2 - y = K$$

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