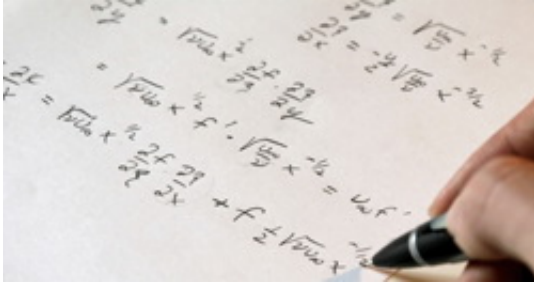# Novel equations improve image processing

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Credit: Thinkstock

A specific class of mathematical equations is helping to solve major challenges in the field, facilitating advanced modelling in a number of applications from climate change to desertification.

Different areas of science and technology (S&T) are increasingly intersecting at a number of disciplines and topics, giving researchers new frontiers to explore. One of these areas is non-linear partial differential equations (NL-PDEs) which have been touted recently as a key tool for accomplishing a large array of image processing tasks. The EU-funded project 'Fronts and interfaces in science and technology' (FIRST) is bringing together engineers and mathematicians with experience in numerical algorithms to solve complex challenges involving NL-PDEs.

This calls for sophisticated mathematical modelling of numerous physical processes seen in different applications, accurately displaying phenomena that reflect hysteresis, delay or long-range-interaction

effects. The project is focusing on applications in image processing and patterns in complex reaction-diffusion systems, as well as interfaces, control and inverse methods in technology challenges.

Focusing on strong exchanges among project participants, the project spans eight universities that are currently offering specialised courses and workshops in the relevant fields. FIRST's highly challenging research modules are proving useful for various contemporary topics such as climate change and desertification. The project is also focusing on mathematical developments such as non-local and higher-order problems, as well as multi-scale and stochastic analysis among other topics.

A set of benefits such as global interaction, new publications and a better understanding of mathematics in complex applications is set to emerge from the project. The results should contribute to overcoming challenges in understanding the world around us and simplifying useful mathematical equations.

Provided by CORDIS