APC PERFORMANCE
ADVANCED PROCESS CONTROL

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PRESS RELEASE

Rate-Predictive Control (RPC®) inherently adaptive control algorithm completes stability analysis at University of Wyoming, Department of Chemical Engineering.

Laramie, Wyoming, May 26, 2017: A research project at the University of Wyoming, Department of Chemical Engineering, has completed a performance and stability analysis of Rate-Predictive Control (RPC®). The research was carried out under the direction of Dr. David M. Bagley, Professor of Chemical Engineering. The Rate-Predictive Control (RPC®) algorithm earned a United States patent in 2016 and is science and industry's *only inherently adaptive* (or "naturally self-tuning") process control algorithm.

> "Rate-Predictive Control (RPC) is a powerful and elegant control algorithm. It is stable under a wide range of conditions and handles deadtime well, too. By following straightforward and conservative guidelines, RPC can be quickly tuned with minimal process information. Furthermore, RPC is incredibly robust and can handle significant process changes without retuning. I have been probing RPC for weaknesses and only become more impressed with its reliability and performance.
>
> - *David M. Bagley, Ph.D., P.E., Professor of Chemical Engineering, University of Wyoming*

The scope of the research project included verification of the underlying control theory of RPC®, verification of its inherently adaptive properties, and stability analysis with and without process deadtime. The tools utilized in the research include MATLAB Simulink, development of the RPC® transfer function, and conventional Bode Diagrams to represent limits of stability. The primary conclusions of the research project (quoted here verbatim) are:

- This analysis confirms the overall control loop and transfer functions determined previously for RPC.
- For a first order process without time delay, RPC® is inherently stable, even for errors in prediction time versus actual process response time.
- For a first order process with time delay, RPC® is stable within a range of constants; the published guidelines for "operational stability" (no overshoot for either the process variable or the output) are much more conservative than conventional process control stability criteria.

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Rate-Predictive Control (RPC®) was invented by Allan Kern, P.E., after several years of investigations into the performance and maintenance limitations industry has experienced with "model-based" control technology. These investigations eventually identified multiple root causes and led to the concept of "model-less" (inherently adaptive) control algorithms. APC Performance, LLC, utilizes Rate-Predictive Control in both single-loop and multivariable process control solutions.

This research report contributes another important validation of the principles of "model-less" process control, in addition to numerous published articles, the granting of a United States patent, and end-user testimonials, some of whose applications have been online for up to two years. Additional information is available at:

- Email ask@APC*performance*.com for a demonstration or to purchase
- Read the stability analysis report on APCperformance.com
- View the model-less process control technology webcast on HydrocarbonProcessing.com
- The RPC® stability/analysis report is planned for publication in late 2017