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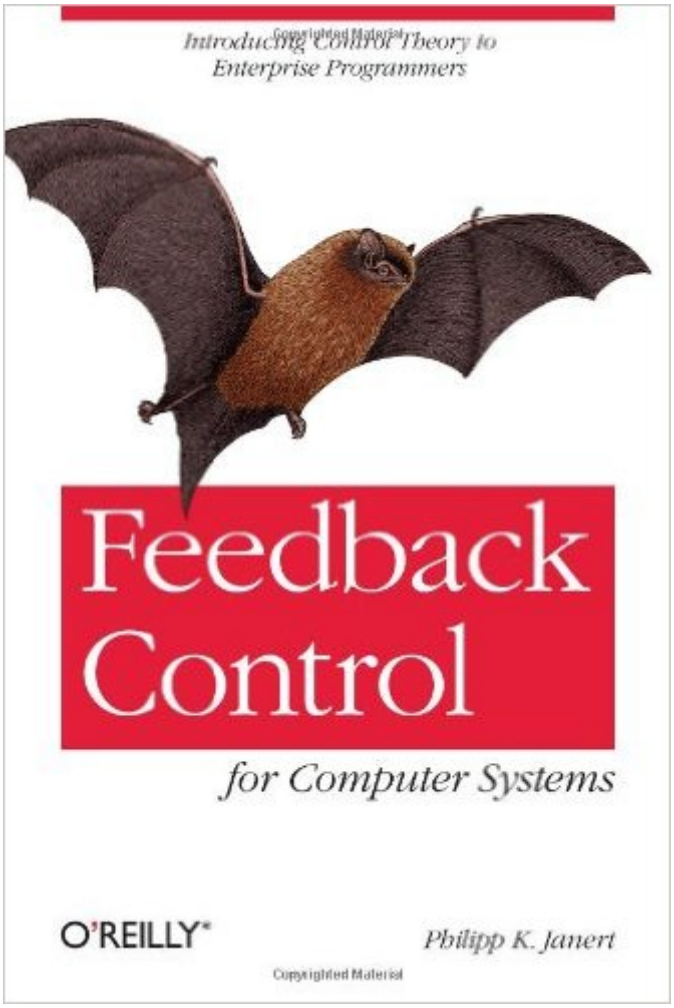
Feedback Control For Computer Systems



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Synopsis

How can you take advantage of feedback control for enterprise programming? With this book, author Philipp K. Janert demonstrates how the same principles that govern cruise control in your car also apply to data center management and other enterprise systems. Through case studies and hands-on simulations, youâ ™ll learn methods to solve several control issues, including mechanisms to spin up more servers automatically when web traffic spikes.Feedback is ideal for controlling large, complex systems, but its use in software engineering raises unique issues. This book provides basic theory and lots of practical advice for programmers with no previous background in feedback control.Learn feedback concepts and controller designGet practical techniques for implementing and tuning controllersUse feedback â œdesign patternsâ • for common control scenariosMaintain a cacheâ ™s â œhit rateâ • by automatically adjusting its sizeRespond to web traffic by scaling server instances automaticallyExplore ways to use feedback principles with queueing systemsLearn how to control memory consumption in a game engineTake a deep dive into feedback control theory

Book Information

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Customer Reviews

If you write code for fun or for a livelihood, I recommend you check this book out.According to the book, Feedback Control is a topic well known to mechanical engineers, but not so much in the software industry. Feedback Control is about making smarter systems that can cope with dynamic environments. Many knobs that developers build into configuration can actually be automated with

feedback loops.Examples given early in the book:* A Cache by tracking hit rate and changing the cache size* A Server Farm by tracking request latency and changing number of deployed server nodes* A Queueing System by tracking wait time and changing the number of workers* A Graphics Library by tracking memory consumption and changing the output resolutionThe book is well written. It starts out with practical examples and working code. It later introduces the deep theory and drops some math bombs. Don’t worry, there is Python code for everything and you don’t have to understand the math.It gives solid advice, like don’t blindly use Feedback Control for optimization; optimization needs a higher level strategy guiding the process.Lastly, there are references for further reading, if you do want to work through more of the theory.The term Enterprise is thrown about, don’t let this scare you away :) This is a valuable book for many types of software problems. A couple I’ve brainstormed while reading:* Controlling difficulty of a video game, to react to how skilled a player is* Controlling aspects of an animation* Controlling polling of APIs for fresh data* Driving load testing to find different scaling points (errors, high latency, etc)

If you have a coding situation that smells even a little bit like a PID controller would help then you should get this book to provide good explanation of how dynamic control behaves in software. Good solid actionable info and clear presentation.Well done and thanks for filling a much needed segment of software fundamentals.

This should be required reading for any software architect or developer that’s working on large scale distributed systems, microservices, cloud computing... anything where correct behavior depends on corrective automation. Engineers working with physical systems -- manufacturing, propulsion, power generation, fabrication, etc. -- have always relied upon the fundamentals of control theory and feedback; for some reason we haven’t included these ideas as part of the core of software engineering. Fix that. Now.

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