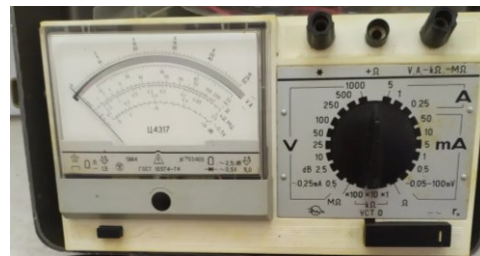


My name is Christophe Basso and I work in the power electronics field for many years. I started writing technical articles at the age of 17. I published my first article in October 1982, in the now defunct French magazine Electronique Radio-Plans. The magazine was run by Christian Duchemin and Claude Ducros who were passionate about publishing original circuits.

October 1982 – First article



The magazine disappeared in 1995 and I have probably published more than 20 articles talking about various electronic circuits readers could tinker. There were many component retailers at that time and most of them are gone now. I remember using an Engel Löther soldering iron, a HM307 from Hameg and a Mashpriborintorg multimeter.



Mashpriborintorg C4317



Engel Löther 60S



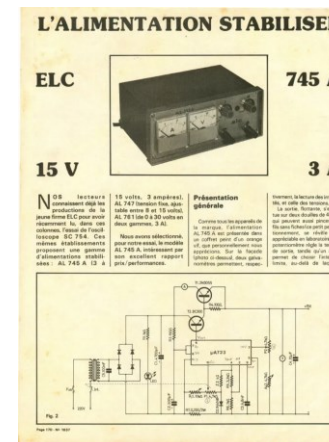
Hameg HM307

It was a system for transmitting the buzz of an old S63 phone to another room via a high-frequency carrier over the mains.

The S63 model

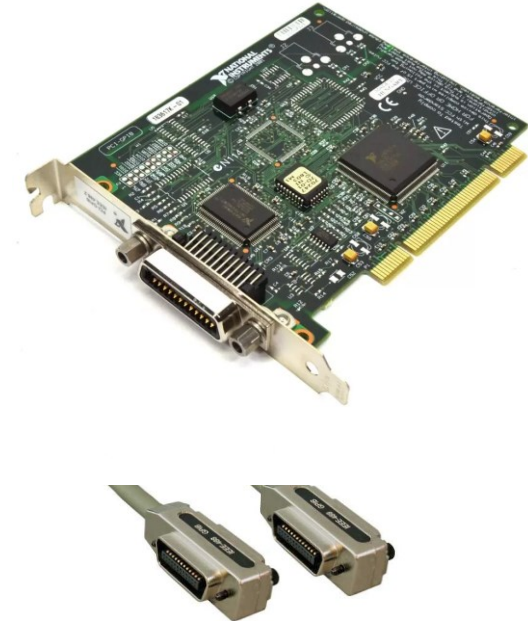
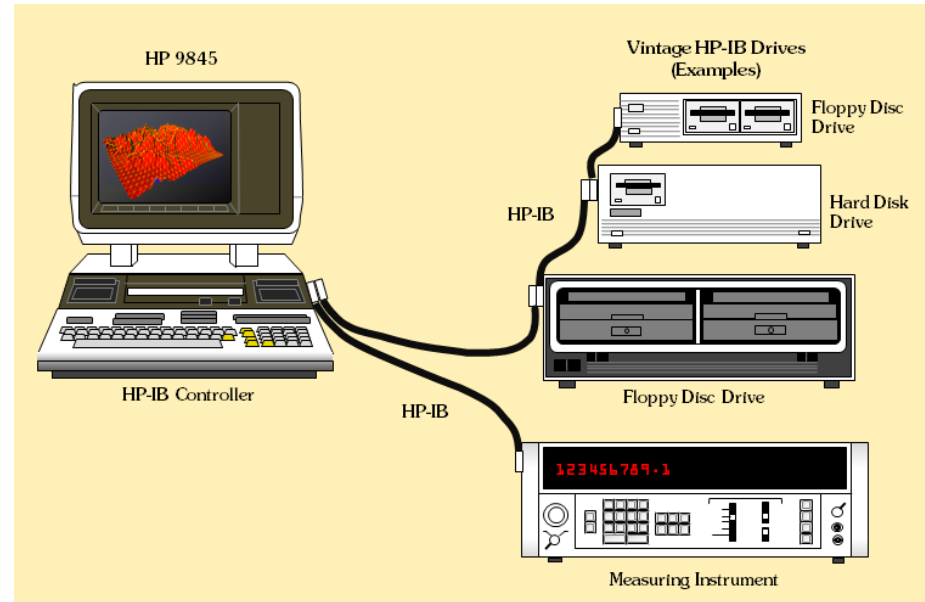


ELC AL745



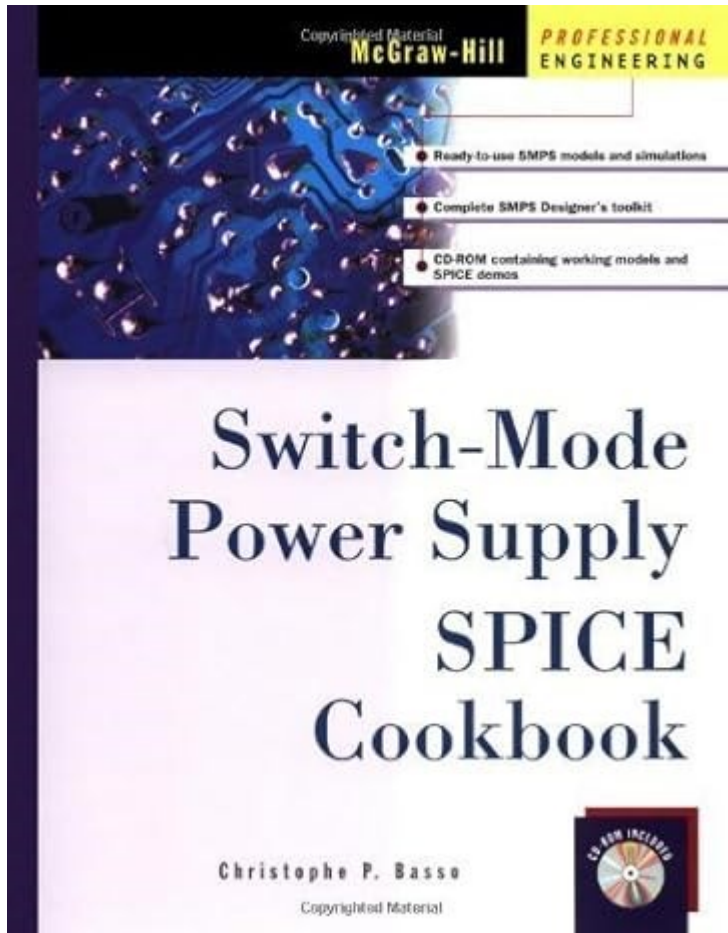
For those who remember, I had bought these equipment at Radio Prim (Allée Verte), Lag Electronic (rue d'Hauteville) and probably ACER and Cibot also.

My first book was published in 1996 and talked about the IEEE-488 bus that I discovered as GPIB-488 when working for Hewlett-Packard in 1986. Most of the instruments, including printers and plotters, were communicating via this high-speed bus. The connectors were bulky and the cable heavy but it was a robust protocol.



The book described the bus operating protocol and explained some of the syntax used in the [SCPI](#) – pronounced skippy – which was taking off in these years. I remember programming in C at that time, with Borland turbo C and some code examples were distributed with the included 3 ½ floppy disk.

This second book was released after I joined Motorola Semiconductors and we had transitioned to SCG – Standard Components Group. It was in 2001. I had already published in EDN, Electronic Design and PCIM US but it was my first book in English. I tried to cover many topologies, offering recipes and simulation models for all of them. I even remember translating a PSpice model for a reader using a very old SPICE version in which I built the logic gates with controlled switches. Yes, I had time in those years :)

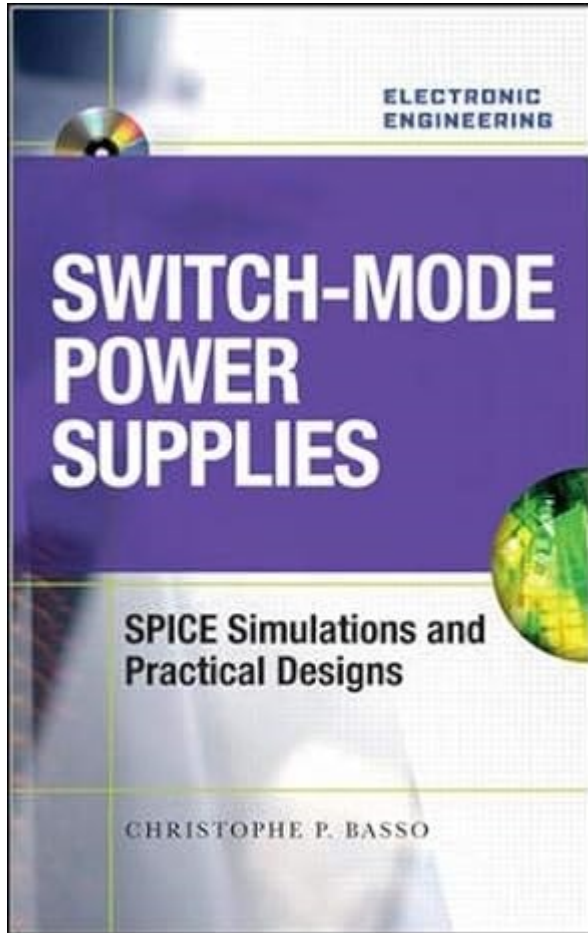


I was using the GSIM model from Dr. Ben-Yaakov at this moment to extract the ac response from converters using averaged models. For current-mode, since I wanted to observe sub-harmonic oscillations, I did adapt the CM models published by Dr. Ridley and did automate some of the operating parameters for specific topologies:

```
*****
.SUBCKT BOOSTDCM Vin Vout Gnd Control D PARAMS: RI=0.803 L=2.93U RS=90M FS=219K VOUT=12V I
* To toggle into Voltage-Mode, put RI=0 and VP becomes VR (The PWM sawtooth amplitude)
.PARAM D={SQRT(2*L*VOUT*(VOUT/VIN-1)/VIN*FS/RL)} ; DC duty cycle for Discontinuous mode
.PARAM VAP={-VOUT}
.PARAM VAC={-VIN}
.PARAM VCP={-VOUT+VIN}
.PARAM IA={-((VOUT^2)/RL/VIN)*D}
.PARAM IP={-VOUT/RL}
.PARAM IC={-VOUT/RL/(1-D)}
.PARAM VP={-VAC*(1/FS)*RI*(MC-1)/L}
* .PARAM VP=VR ; Put RI=0 and remove this start (while putting it at the above line) turns
EBD D 0 VALUE = {D}
RL Vin LL {RS}
L LL C {L}
X1 Gnd Vout C Vin Control PWMDCM PARAMS: RI={-RI} L={L} FS={FS} RL={RL} D={D}
+ VAP={VAP} VAC={VAC} VCP={VCP} IC={IC} IA={IA} IP={IP} VP={VP}
.ENDS
~^
```

I remember Dan Mitchell kindly wrote the foreword of this book. I had met Dan in person at an EJ Bloom course in the UK, in 1996 and later at a PESC event in Galway.

This third book was a step above what I did with the previous one. I released it in 2008, with McGraw-Hill. It took me several years to write as I actually developed auto-toggling DCM-CCM averaged models based around the PWM switch from Dr. Vorpérian. I not only released a voltage-mode subcircuit but also a DCM-CCM version in current-mode, whose DCM version was not available. I then did expand the family to a quasi-resonant type of switch.



Switch-Mode Power Supplies Spice Simulations and Practical Designs 1st Edition

by [Christophe Basso](#) (Author)

4.7 ★★★★★ 42 ratings

[See all](#)



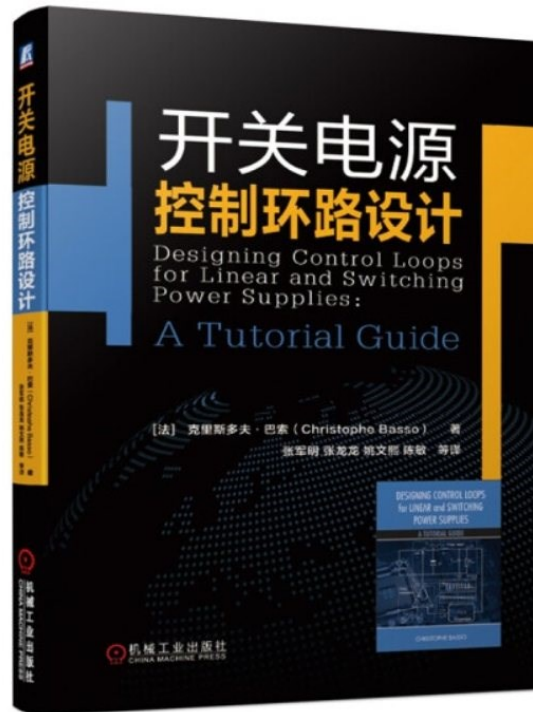
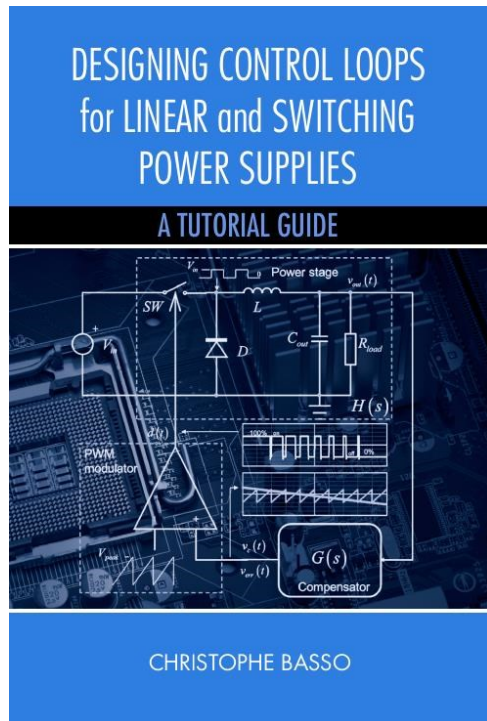
Mandarin version



Korean version

The book as been printed and sold in many formats then translated in Mandarin and Korean. I remember including the demonstration versions of the SPICE editors from that period plus many ready-made examples in IsSpice, PSpice and Micro-CAP to cite the few I built.

In 2012, I released this new title, 100% dedicated to loop control. I went through theory and then covered all the possible compensators I could think of, including the shunt regulator from PI. The book has been very successful but suffered from many typos and errors in the pages. I plead guilty for some of them of course but many were due to the poor typesetting job subcontracted by the publisher. The result was terrible and when reading the material after the many passes coming back to me for checking, I lost months trying to fix them. Even some of the original equations had been rewritten without my consent, leading to the long errata list I then published in my website, not counting the symbols that did not go through after the print. I am grateful to the many readers who collected the typos and helped me consolidate the errata lists on my [webpage](#).



Designing Control Loops for Linear and Switching Power Supplies: A Tutorial Guide

by [Christophe Basso](#) (Author)

4.6 ★★★★★ 46 ratings

[See all formats and editions](#)

Type 2 Amplifier. Required boost less than 90° (less than 70°, in practice)

Design parameters

Cross-over frequency F_c : 1000 Hz
 Phase margin: 70°
 Upper feedback resistor: 11800 ohms

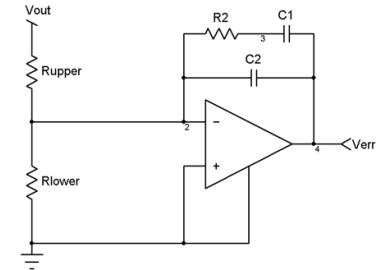
Parameters extracted from Bode plot

Gain read at F_c (pos. or neg. dBs): -1.0 dBs
 Phase at F_c (negative degrees): -78.0°

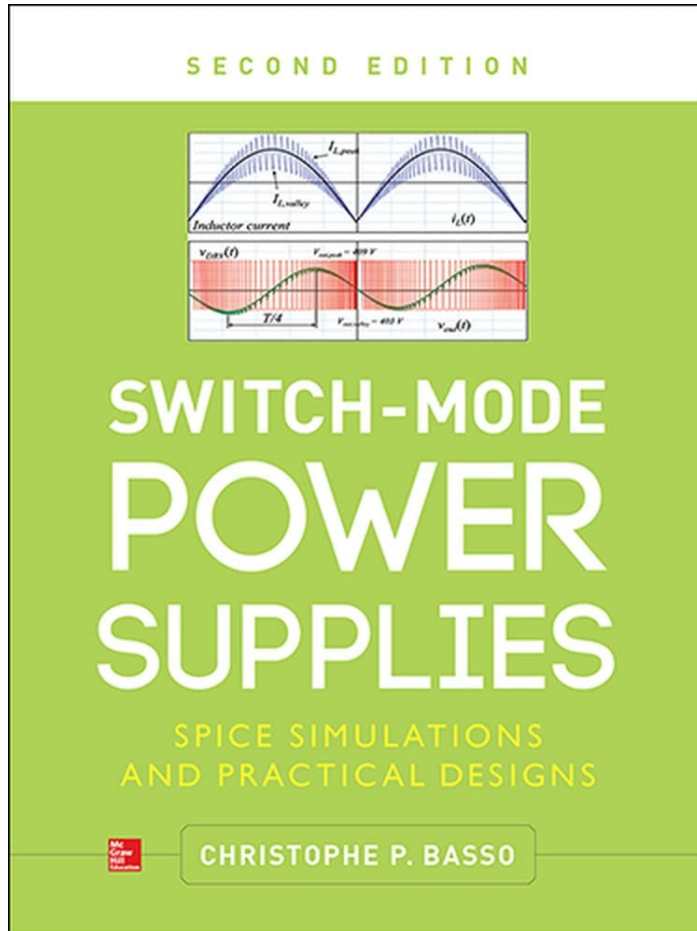
Calculated parameters

Phase Boost: 58.00°
 K: 3.49
 Required gain at F_c : 1.12
 C2: 3446.9 pF
 C1: 38.475 nF
 R2: 14.43 kohms

1st Pole, C2-R2: 3.49 kHz
 1st Zero, C1-R2: 0.29 kHz



In 2014, I worked on the second edition of the 2008 book, Switch-Mode Power Supplies SPICE Simulations and Practical Designs. I did add more substance and the book did benefit from the experience I had acquired while supporting customers world-wide. I had released many ASICs running in high volume and seen many different industrial products, successfully hitting production or failing due to the lack of margins or poorly-designed loops.



Switch-Mode Power Supplies, Second Edition: SPICE Simulations and Practical Designs 2nd Edition

by [Christophe P. Basso](#) (Author)

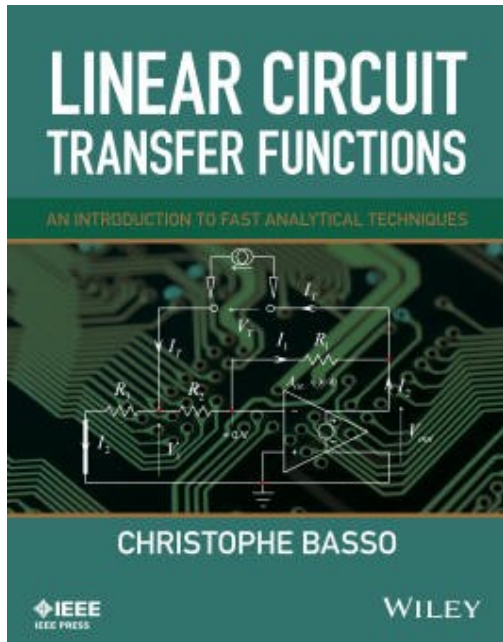
4.7 ★★★★★ 34 ratings

[See all f](#)



The book has been translated in Mandarin by McGraw-Hill and is still smooth-selling, despite it's availability as a downloadable version. I've been asked to work on a 3rd edition but I turned down the offer considering the new projects I was involved in.

In 2016, I released this new book, dedicated to solving transfer functions using the fast analytical circuits techniques or FACTs. Dr. Vorpérian who had published a book on the subject, in 2004 – after Dr. Middlebrook taught his course on design-oriented analysis (D-OA) – came to Toulouse and gave a 4-day course on the subject. I really did enjoy the content (Vatché is truly an analytical artist) but, in my opinion, some of the examples were overly complicated and many folks in the audience gave up, believing it was too much for their daily tasks. After having acquired the skill, I decided to build a seminar for [APEC](#) and then released this book. My approach was different as I adopted baby steps with very basic circuits to start with and then introduced SPICE to determine poles but also verify zeroes by simulating a null double injection.

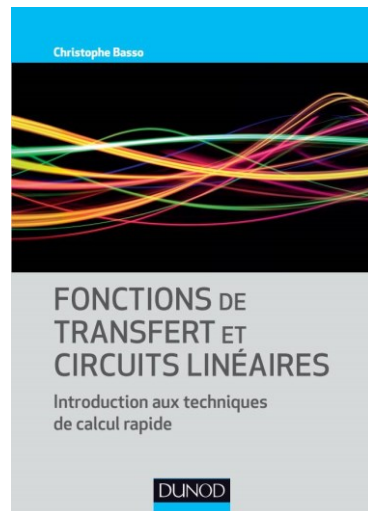


Linear Circuit Transfer Functions: An Introduction to Fast Analytical Techniques (IEEE Press) 1st Edition

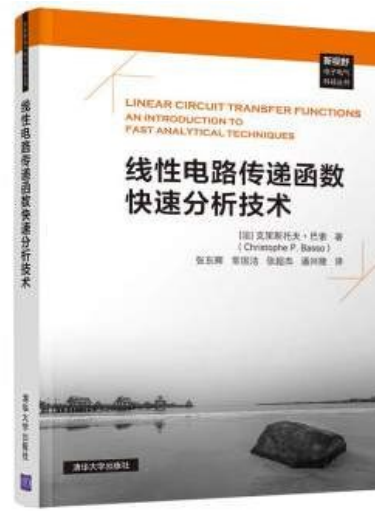
by [Christophe P. Basso](#) (Author)

4.9 ★★★★★ 15 ratings

[See all formats ar](#)

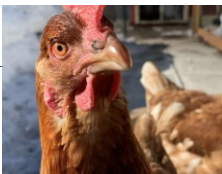
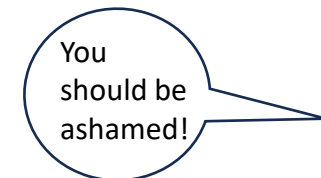
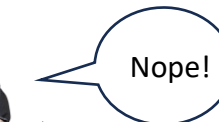


French (7)



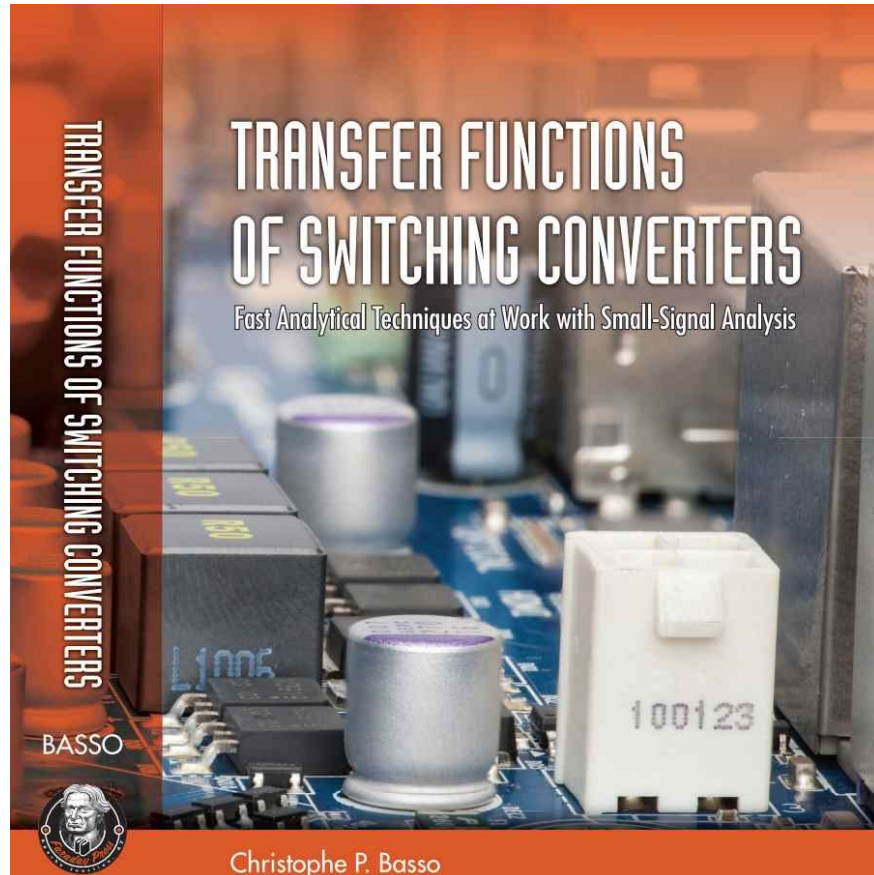
Mandarin

Some grumpy old timers told me that it was sacrilegious to publish on a subject that had been formalized and carved by luminaries in our field. But I did not see myself as Prometheus, “reproducing” (original term) what others did before, no, I did modestly shed a different light on a complicated matter – the way I understood it – and I’m proud to say that many acquired the skill after reading the book: this is my best reward!



The French version was a complete rewrite and a difficult exercise as I had troubles writing in my native language!

After several years of intensive work – and I’m not exaggerating here – I released this title with Faraday Press and Ken Coffman as the editor. It was truly a tour-de-force to lay this book out considering the gigantic Word files, embedding graphics and formulas, taking ages to update when the program was not crashing. I think Ken said that publishing this book was “a near-death experience” considering all the work he did invest. But it came out in June 2021 and it was well received by our community. To go along with the content, I did release many [ready-made templates](#) running on the free demo of SIMPLIS so that every one could check results.

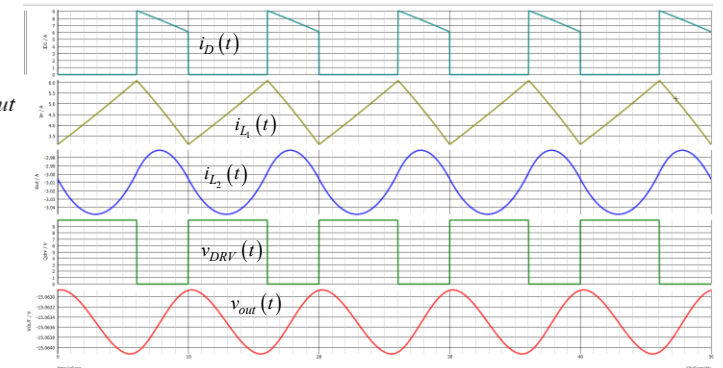
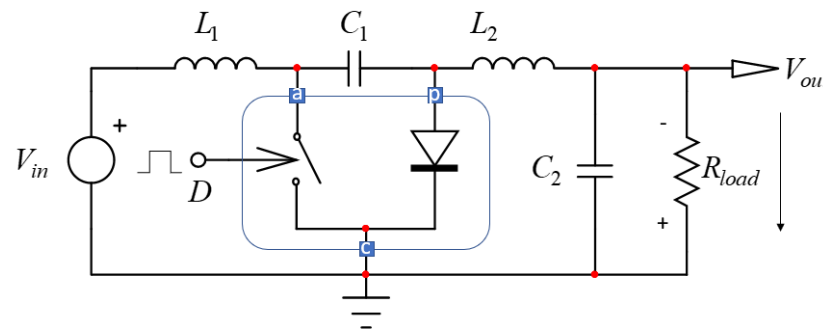


Transfer Functions of Switching Converters

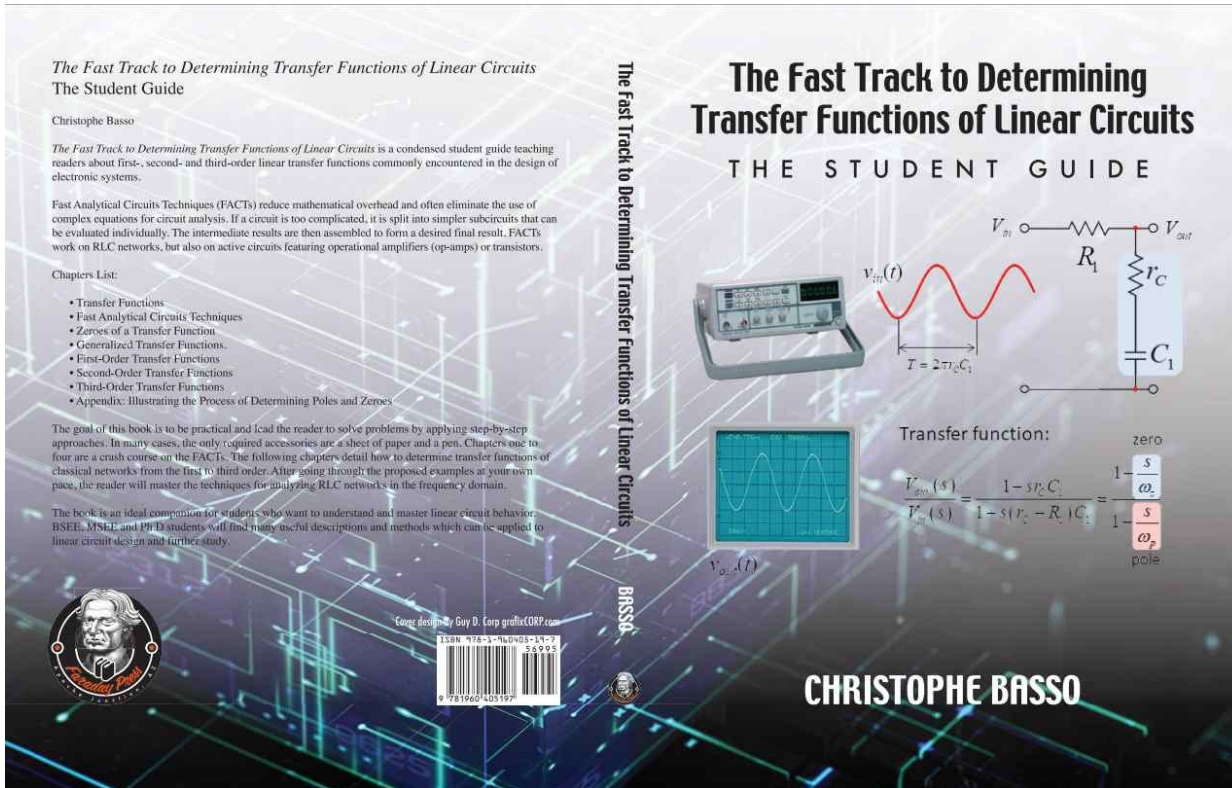
by Christophe P Basso (Author)

4.3 ★★★★★ 25 ratings

I have spent a great amount of time in crafting drawings and labeling schematic diagrams. But what took the longest time, was to derive some of the small-signal models I did not have and then apply them to the topologies for which I wanted the four transfer functions. But I did it!



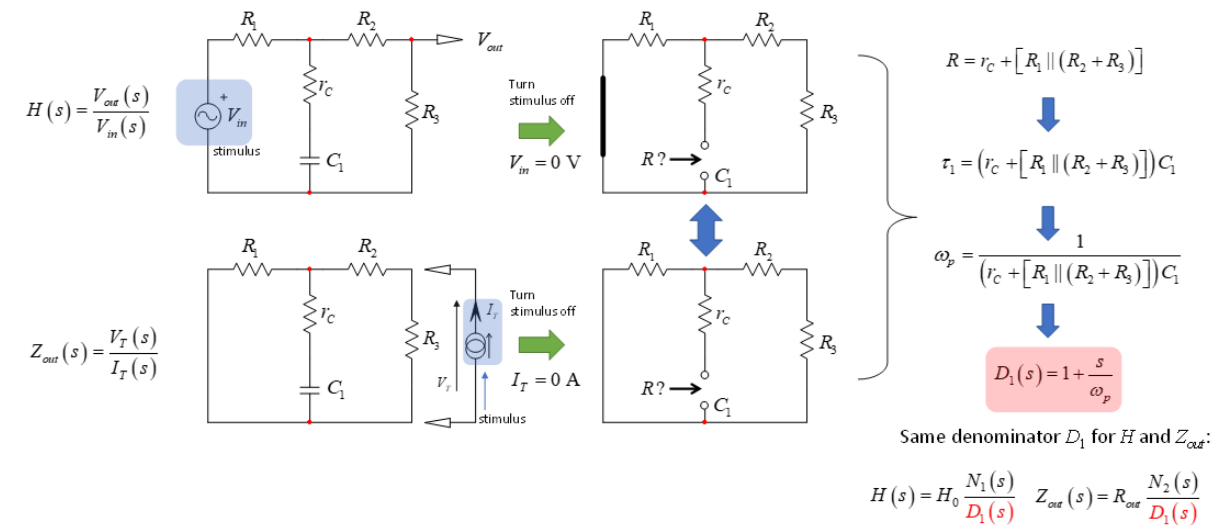
This “fast track” manual is a follow-up of the book I published in 2016 on the fast analytical circuits techniques. I wanted to release a simpler manual, leading the engineer or the student straight to the point. Like a crash course If you want. As such, there is an introductory part teaching what poles and zeroes are and how to determine them swiftly. The main interest, in my opinion, lies in the numerous solved examples for 1st, 2nd and 3rd-order circuits. I really did start with simple RC networks and determined, step-by-step, their transfer functions in well-documented and crafted, colored examples. So if you want to learn FACTs, this is the manual you need. A Chinese version is on its way.



The Fast Track to Determining Transfer Functions of Linear Circuits: The Student Guide

by **Christophe Basso** (Author)
5.0 ★★★★★ 2 ratings

[See all formats and e](#)



This is the tenth book, again, 100% dedicated to loop control but in a different format. First off, I wrote in Power Point and not Word this time. Enough of crashing programs and hanging macros for renumbering equations. This time, text, illustrations and comments, directly written on the pages. Second, the book size is purposely limited to keep the page count at a reasonable number and thus, the selling price is low. Yes, it bothers me to see some of my books sold at 160 € while the publisher sells them 89 USD direct. So a more affordable and simpler-to-read book this time. And third, there will be an eBook version for those of you traveling or wanting to browse the content on a tablet. I know what you will say, the minute the eBook is released, it is online for free. But if those who can't afford the book learn and build better, safer products, then I will have accomplished my modest mission which is to share the knowledge that I acquired while talking, emailing and exchanging with all of you worldwide! Due for release in September 2024.

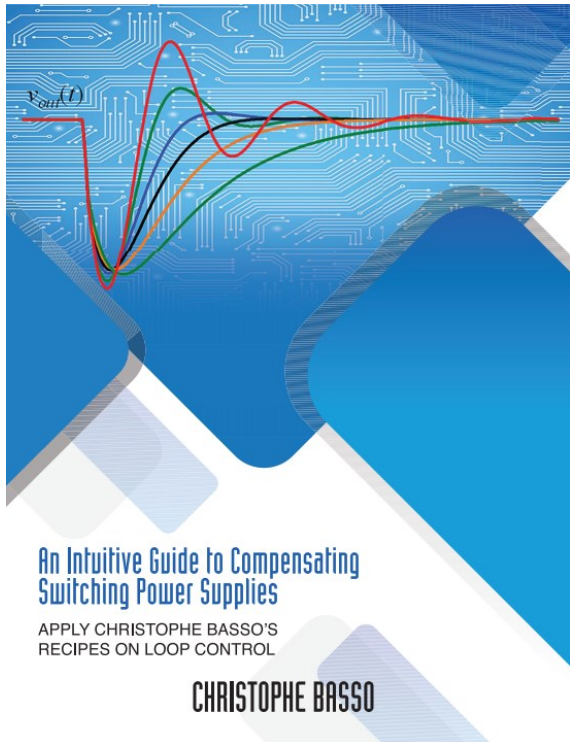


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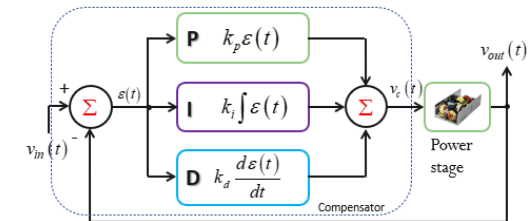
The Sections on Theory

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- [Feedback to the Rescue](#)
- [Building an Oscillator](#)
- [Keep Away from Oscillations](#)
- [Transient Response](#)
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The PID Block

A PID COMPENSATOR combines the three functions that are listed below:

- **Proportional:** it sizes the error signal amplitude with the observed deviation. If small, a reduced driving voltage is delivered. On the opposite, if the regulated value deviates significantly from the target, the corrective action is stronger. It is a gain term noted k_p .
- **Integral:** this is an integrator featuring a pole placed at the origin with a time constant. This block, characterized by k_i , accumulates the error over time and biases the control input until the deviation between the setpoint and the target is eliminated. The theoretical infinite gain of the equation at dc ($s = 0$) is physically bounded by A_{OL} , the op-amp open-loop gain.
- **Derivative:** this part, adjusted by k_d , reacts to the slope of the observed change. If the deviation is slow, no need to rush and a smooth reaction is enough. Should the deviation be fast, then the reaction shall be swifter. The term k_d has no action at steady-state since the differentiation of a constant value is zero.



The transfer function linking the response V_c to the stimulus ε is the sum of the three contributors:

$$G_{\text{PID}}(s) = \frac{V_c(s)}{\varepsilon(s)} = k_p + \frac{k_i}{s} + s k_d = k_p \left(1 + \frac{1}{s \tau_i} + s \tau_d \right) \text{ with } \tau_i = \frac{k_p}{k_i} \quad \tau_d = \frac{k_p}{k_d}$$

