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17. Differential implementation; 18. Summary and conclusions; Part IV. Four-Phase High-Q Bandpass Filters: 19. Introduction; 20. Impedance transformation by a four-phase filter; 21. Differential implementation of four-phase high-Q bandpass filter; 22. Application as an on-chip SAW filter; 23. Impact of harmonics on the sharpness of the proposed filter; 24. Four-phase high-Q bandpass filter with a complex baseband impedance; 25. Four-phase high-Q bandpass filter with quadrature RF inputs; 26. Harmonic upconversion and downconversion; 27. A SAW-less receiver with on-chip four-phase high-Q bandpass filters; 28. Summary and conclusions; Part V. M-Phase High-Q Bandpass Filters: 29. Introduction; 30. Impedance transformation by M-phase filters; 31. Differential implementation of M-phase high-Q filter; 32. Application as an on-chip SAW filter; 33. Impact of harmonics on the sharpness of the M-phase bandpass filter; 34. M-phase high-Q filter with complex baseband impedances; 35. M-phase high-Q bandpass filter with quadrature RF inputs; 36. M-phase high-Q bandpass filter with N-phase complex bandpass filters; 37. Harmonic upconversion; 38. Summary and conclusions; Part VI. Design of a Superheterodyne Receiver Using M-Phase Filters: 39. Introduction; 40. Proposed superheterodyne receiver architecture; 41. Design and implementation of the receiver chain; 42. Measurement results; 43. Summary and conclusions; Part VII. Impact of Imperfections on the Performance of M-Phase Filters: 44. Introduction; 45. Mathematical background; 46. LO phase noise; 47. Second-order nonlinearity in the switches of the bandpass filter; 48. Quadrature error in the original 50% duty-cycle clock phases; 49. Harmonic downconversion; 50. Thermal noise of switches; 51. Parasitic capacitors of switches; 52. Switch charge injection; 53. Mismatches; 54. Summary and conclusions; Part VIII. M-Phase Filtering and Duality: 55. Introduction; 56. Dual of an electrical circuit, dual of a switch; 57. Dual of M-phase filter, differential implementation of M-phase filter and its dual; 58. Dual of M-phase high-Q filter with complex baseband impedances; 59. Summary and conclusions.

Sommario/riassunto

Examining the most important developments in highly integrated wireless RF front ends, this book describes and evaluates both active and passive solutions for on-chip high-Q filtering, and explores M-phase filters in depth. An accessible step-by-step approach is used to introduce everything an RF designer needs to know about these filters, including their various forms, principles of operation, and their performance against implementation-related imperfections. Real-world examples are described in depth, and detailed mathematical analyses demonstrate the practical quantification of pertinent circuit parameters.