

# Activity - Practice with Complex Circuits

$$V = IR$$

## Part I

In the circuits below, the voltage of the battery is 12 V and each resistor is 2  $\Omega$ . For each circuit:

- Describe the circuit and any assumptions you make. Which resistors are in series? Which are in parallel?
- Calculate the current through each resistor and the voltage across each resistor.

Total:  $8 + 2 = 10$

$$A = \frac{2 \Omega}{4.67} (12)$$

5.13

$$2 + 2 = 4 \Omega \text{ (series)} \quad \frac{1}{2} + \frac{1}{2} + \frac{1}{2} = \frac{3}{2} = \frac{2}{3} \text{ (parallel)}$$

$$4 + \frac{2}{3} = 4.67 \Omega = \text{total}$$

Series =  $2 + 2 + 2 + 2 = 8 \Omega$

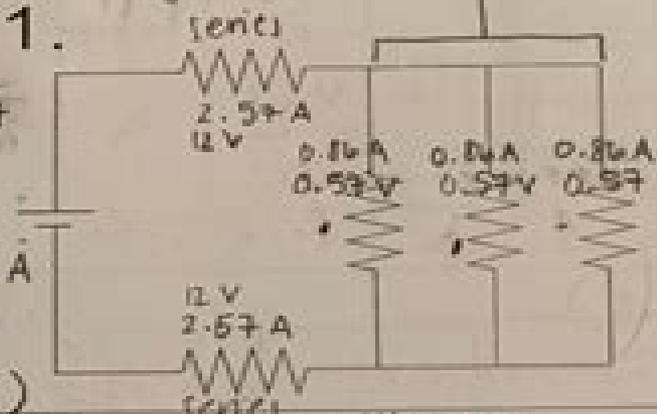
Parallel =  $\frac{1}{2} = 2 \Omega$

because 3 parallel  $V = IR \rightarrow I = \frac{V}{R} = \frac{12}{10} = 1.2 \text{ A}$

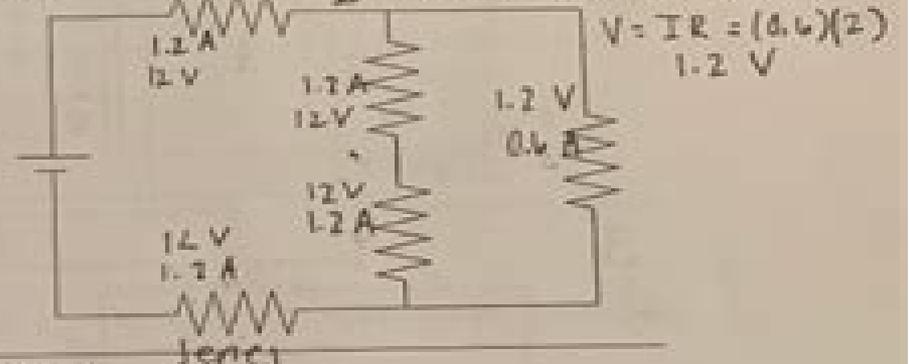
$$V = IR$$

$$I = \frac{V}{R} = \frac{12}{4.67}$$

$$I = 2.57$$



2.  $\frac{1.2}{2} = 0.6 \text{ A for parallel resistor}$



$$\frac{2.57 \text{ A}}{3} = 0.86 \text{ A}$$

$$V = IR$$

$$V = (0.86)(2)$$

$$V = 1.72 \text{ V}$$

3

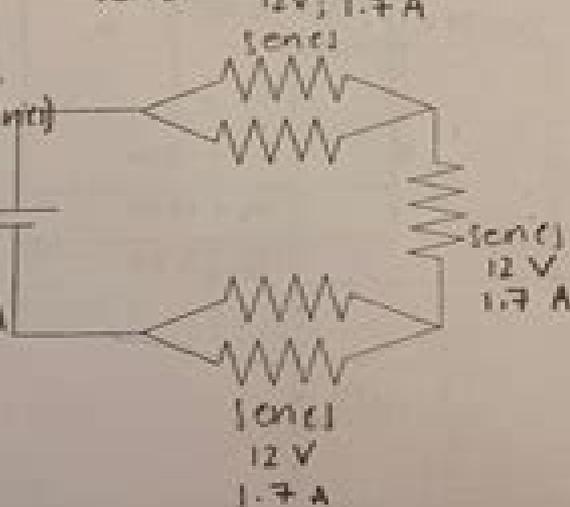
$$\text{Total } R = 6 + 1 = 7 \Omega$$

$$2 + 2 + 2 = 6 \Omega \text{ (series)}$$

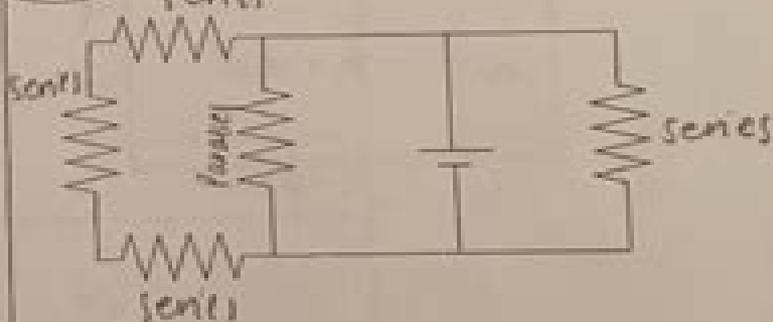
$$\frac{1}{2} + \frac{1}{2} = \frac{2}{2} = 1 \Omega \text{ (parallel)}$$

$$V = IR$$

$$I = \frac{V}{R} = \frac{12}{7} = 1.7 \text{ A}$$



4



# Complex Circuit Problems And Solutions

**Yan Bai**



## **Complex Circuit Problems And Solutions:**

**Electric Circuit Problems with Solutions** F. A. Benson, 2012-12-06 Electrical engineering and electronic engineering students have frequently to resolve and simplify quite complex circuits in order to understand them or to obtain numerical results and a sound knowledge of basic circuit theory is therefore essential The author is very much in favour of tutorials and the solving of problems as a method of education Experience shows that many engineering students encounter difficulties when they first apply their theoretical knowledge to practical problems Over a period of about twenty years the author has collected a large number of problems on electric circuits while giving lectures to students attending the first two post intermediate years of University engineering courses The purpose of this book is to present these problems a total of 365 together with many solutions some problems with answers given at the end of each Chapter are left as student exercises in the hope that they will prove of value to other teachers and students Solutions are separated from the problems so that they will not be seen by accident The answer is given at the end of each problem however for convenience Parts of the book are based on the author's previous work *Electrical Engineering Problems with Solutions* which was published in 1954

**Electric Circuit Problems with Solutions** F. A. Benson, 1975-04-24 Electrical engineering and electronic engineering students have frequently to resolve and simplify quite complex circuits in order to understand them or to obtain numerical results and a sound knowledge of basic circuit theory is therefore essential The author is very much in favour of tutorials and the solving of problems as a method of education Experience shows that many engineering students encounter difficulties when they first apply their theoretical knowledge to practical problems Over a period of about twenty years the author has collected a large number of problems on electric circuits while giving lectures to students attending the first two post intermediate years of University engineering courses The purpose of this book is to present these problems a total of 365 together with many solutions some problems with answers given at the end of each Chapter are left as student exercises in the hope that they will prove of value to other teachers and students Solutions are separated from the problems so that they will not be seen by accident The answer is given at the end of each problem however for convenience Parts of the book are based on the author's previous work *Electrical Engineering Problems with Solutions*, which was published in 1954

**Practical Synthesis of High-Performance Analog Circuits** Emil S. Ochotta, Tamal Mukherjee, Rob A. Rutenbar, L. Richard Carley, 2012-12-06 *Practical Synthesis of High Performance Analog Circuits* presents a technique for automating the design of analog circuits Market competition and the astounding pace of technological innovation exert tremendous pressure on circuit design engineers to turn ideas into products quickly and get them to market In digital Application Specific Integrated Circuit ASIC design computer aided design CAD tools have substantially eased this pressure by automating many of the laborious steps in the design process thereby allowing the designer to maximise his design expertise But the world is not solely digital Cellular telephones magnetic disk drives neural networks and speech recognition systems are a few of the

recent technological innovations that rely on a core of analog circuitry and exploit the density and performance of mixed analog digital ASICs To maximize profit these mixed signal ASICs must also make it to market as quickly as possible However although the engineer working on the digital portion of the ASIC can rely on sophisticated CAD tools to automate much of the design process there is little help for the engineer working on the analog portion of the chip With the exception of simulators to verify the circuit design when it is complete there are almost no general purpose CAD tools that an analog design engineer can take advantage of to automate the analog design flow and reduce his time to market Practical Synthesis of High Performance Analog Circuits presents a new variation tolerant analog synthesis strategy that is a significant step towards ending the wait for a practical analog synthesis tool A new synthesis strategy is presented that can fully automate the path from a circuit topology and performance specifications to a sized variation tolerant circuit schematic This strategy relies on asymptotic waveform evaluation to predict circuit performance and simulated annealing to solve a novel non linear infinite programming optimization formulation of the circuit synthesis problem via a sequence of smaller optimization problems Practical Synthesis of High Performance Analog Circuits will be of interest to analog circuit designers CAD EDA industry professionals academics and students **University of Colorado Catalogue** University of Colorado,1929 Bulletin University of Colorado Boulder,1928 *Electric Circuit Problems* Frank Atkinson Benson,1967 *Numerical Methods for Nonlinear Engineering Models* John R. Hauser,2009-03-24 There are many books on the use of numerical methods for solving engineering problems and for modeling of engineering artifacts In addition there are many styles of such presentations ranging from books with a major emphasis on theory to books with an emphasis on applications The purpose of this book is hopefully to present a somewhat different approach to the use of numerical methods for engineering applications Engineering models are in general nonlinear models where the response of some appropriate engineering variable depends in a nonlinear manner on the plication of some independent parameter It is certainly true that for many types of engineering models it is sufficient to approximate the real physical world by some linear model However when engineering environments are pushed to treme conditions nonlinear effects are always encountered It is also such treme conditions that are of major importance in determining the reliability or failure limits of engineering systems Hence it is essential than engineers have a toolbox of modeling techniques that can be used to model nonlinear engineering systems Such a set of basic numerical methods is the topic of this book For each subject area treated nonlinear models are incorporated into the discussion from the very beginning and linear models are simply treated as special cases of more general nonlinear models This is a basic and fundamental difference in this book from most books on numerical methods *Proceedings of the Twenty-Third Annual Conference of the Cognitive Science Society* Johanna D. Moore,Keith Stenning,2001 Vol includes all papers and posters presented at 2001 Cog Sci Mtg summaries of symposia invited addresses Deals w issues of repres model g cog processes Appeals to scholars in subdisciplines that comprise Cog Sci Psych Computr Sci Neuro Lin *Catalogue Number* University

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Systems: From Biology to Hardware Gregory S. Hornby,Lukas Sekanina,Pauline C. Haddow,2008-09-28 This book constitutes  
the refereed proceedings of the 8th International Conference on Evolvable Systems ICES 2008 held in Prague Czech  
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circuits hardware software codesign and platforms for adaptive systems evolutionary robotics development real world  
applications evolutionary networking evolvable artificial neural networks and transistor level circuit evolution

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Radio Research Board,1929     **Free Night School of Engineering** Cooper Union for the Advancement of Science and Art.  
School of Engineering,1928     *The Analysis and Design of Linear Circuits* Roland E. Thomas,Albert J. Rosa,Gregory J.  
Toussaint,2020-07-15 While most texts focus on how and why electric circuits work *The Analysis and Design of Linear*  
*Circuits* taps into engineering students desire to explore create and put their learning into practice Students from across  
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judgement surrounding design problems and innovative solutions this unique text provides inspiration and motivation  
alongside an essential knowledge base     **On Growth, Form and Computers** Sanjeev Kumar,Peter J. Bentley,2003-10-03  
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