

D Lists of Figures and Tables



D.1 List of Figures



2.1	The functional design method (a) at the highest level and (b) in general, for any level.	55
3.1	A “computer room” at the NACA (precursor to NASA) high-speed flight station in 1949 (NASA 2002).	63
3.2	Percent predicted probability of public policy adoption for economic elites and average citizens. Study, results, and statistical model by Gilens and Page (2014).	82
3.3	A graph of polynomial $f(x)$.	84
3.4	Ideal gas pressure versus volume for different temperatures.	86
3.5	A bar chart of thermal conductivity for metals (data from Carvill (1994)).	88
3.6	A histogram of my movie ratings on a 0–10 scale.	89
3.7	A polygon and vectors from R to two consecutive vertices.	96
4.1	A symbolic expression tree for $\text{sp.sqrt}(3)/2$.	101
4.2	A truss with pinned joints, supported by a hinge and a floating support, with an applied force f_F .	118
4.3	A graph of $\sqrt{r^2 + 1}$, where $r = w/h$.	122
4.4	A resistor circuit design for example 4.2.	127
4.5	A design graph for resistors R_1 , R_2 , and R_3 .	130
4.6	An electromechanical schematic of a DC motor.	141
4.7	The state response to a unit step voltage input.	143
4.8	A truss with pinned joints, supported by two hinges, with an applied load f_D .	145
4.9	A truss with pinned joints, supported by a hinge and a floating support, with an applied load f_C .	146
4.10	An RLC circuit with a voltage source $V_S(t)$.	147

6.1	A visualization of the design process as the selection of an element from the design space \mathcal{D} that is in a region of the output space \mathcal{O} that meets the requirements.	206
6.2	A single design set D , the solution f of its set E of governing equations, and the inverse solution f^{-1} . The local optimal design $d^* = f^{-1}(y^*)$.	210
6.3	Sketch of the extruder design.	212
6.4	The constrained loss function $L(d)$ versus a single adjustable, the thermal resistance R_T .	216

D.2 List of Tables



1.1	Boolean and comparison operators on Boolean and integer inputs x and y	17
1.2	Format specifier terms.	19
1.3	Format specifier types.	19
1.4	Some particularly useful string methods.	20
1.5	Mutability of commonly used built-in types.	22
1.6	Commonly used list methods for a list l .	23
1.7	Dictionary instance methods for dictionary instance d and class method for class <code>dict</code> .	26
2.1	Python standard library modules of particular interest to the engineer.	42
3.1	JSON to Python reading conversion.	77
3.2	Python to JSON writing conversion.	78
4.1	Elementary mathematical functions in SymPy.	103