编译原理第二次实验——语法分析器

姓名：平雅霓　学号：2017211949

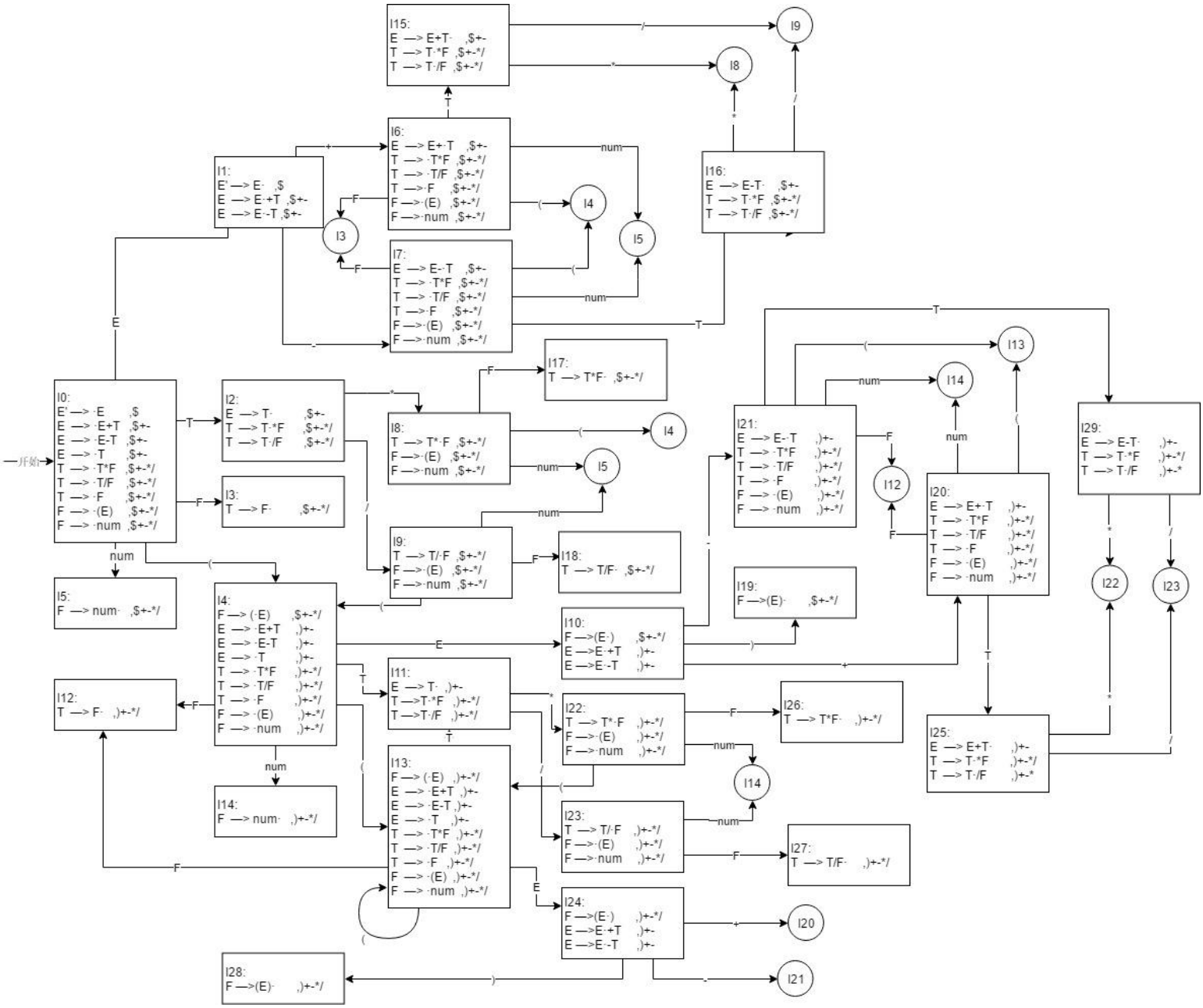
文法：

E —> E+T | E-T | T

E —> T * F | T / F | F

E —> (E) | num

1. 识别该文法的 DFA

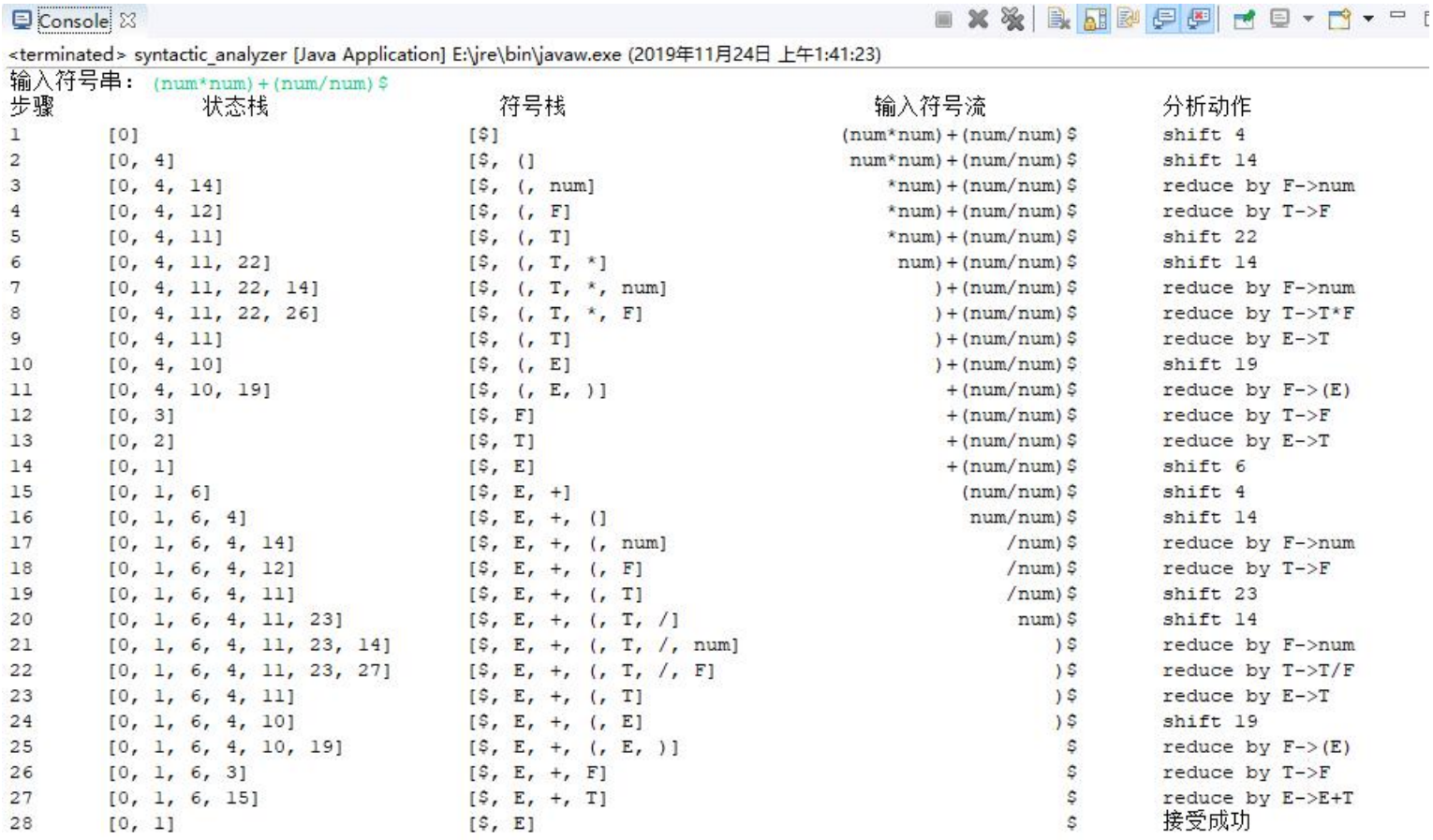


2. LR 分析表

状态	action								goto		
	(	)	+	-	*	/	num	$	E	T	F
0	S4						S5		1	2	3
1			S6	S7				ACC			
2			R3	R3	S8	S9		R3			
3			R6	R6	R6	R6		R6			
4	S13						S14		10	11	12
5			R8	R8	R8	R8		R8			
6	S4						S5			15	3
7	S4						S5			16	3
8	S4						S5				17
9	S4						S5				18
10		S19	S20	S21							
11		R3	R3	R3	S22	S23					
12		R6	R6	R6	R6	R6					
13	S13						S14		24	11	12
14		R8	R8	R8	R8	R8					
15			R1	R1	S8	S9		R1			
16			R2	R2	S8	S9		R2			
17			R4	R4	R4	R4		R4			
18			R5	R5	R5	R5		R5			
19			R7	R7	R7	R7		R7			
20	S13						S14			25	12
21	S13						S14			29	12
22	S13						S14				26
23	S13						S14				27
24		S28	S20	S21							
25		R1	R1	R1	S22	S23					
26		R4	R4	R4	R4	R4					
27		R5	R5	R5	R5	R5					
28		R7	R7	R7	R7	R7					
29		R2	R2	R2	S22	S23					

3. 分析程序的运行结果

输入字符串为：(num*num)+(num/num)$



Console

<terminated> syntactic_analyzer [Java Application] E:\jre\bin\javaw.exe (2019年11月24日 上午1:41:23)

输入符号串： (num*num)+(num/num)$

步骤	状态栈	符号栈	输入符号流	分析动作
1	[0]	[$]	(num*num)+(num/num)$	shift 4
2	[0, 4]	[$, (]	num*num)+(num/num)$	shift 14
3	[0, 4, 14]	[$, (, num]	*num)+(num/num)$	reduce by F->num
4	[0, 4, 12]	[$, (, F]	*num)+(num/num)$	reduce by T->F
5	[0, 4, 11]	[$, (, T]	*num)+(num/num)$	shift 22
6	[0, 4, 11, 22]	[$, (, T, *]	num)+(num/num)$	shift 14
7	[0, 4, 11, 22, 14]	[$, (, T, *, num]	)+(num/num)$	reduce by F->num
8	[0, 4, 11, 22, 26]	[$, (, T, *, F]	)+(num/num)$	reduce by T->T*F
9	[0, 4, 11]	[$, (, T]	)+(num/num)$	reduce by E->T
10	[0, 4, 10]	[$, (, E]	)+(num/num)$	shift 19
11	[0, 4, 10, 19]	[$, (, E,)]	+(num/num)$	reduce by F->(E)
12	[0, 3]	[$, F]	+(num/num)$	reduce by T->F
13	[0, 2]	[$, T]	+(num/num)$	reduce by E->T
14	[0, 1]	[$, E]	+(num/num)$	shift 6
15	[0, 1, 6]	[$, E, +]	(num/num)$	shift 4
16	[0, 1, 6, 4]	[$, E, +, (]	num/num)$	shift 14
17	[0, 1, 6, 4, 14]	[$, E, +, (, num]	/num)$	reduce by F->num
18	[0, 1, 6, 4, 12]	[$, E, +, (, F]	/num)$	reduce by T->F
19	[0, 1, 6, 4, 11]	[$, E, +, (, T]	/num)$	shift 23
20	[0, 1, 6, 4, 11, 23]	[$, E, +, (, T, /]	num)$	shift 14
21	[0, 1, 6, 4, 11, 23, 14]	[$, E, +, (, T, /, num]	)$	reduce by F->num
22	[0, 1, 6, 4, 11, 23, 27]	[$, E, +, (, T, /, F]	)$	reduce by T->T/F
23	[0, 1, 6, 4, 11]	[$, E, +, (, T]	)$	reduce by E->T
24	[0, 1, 6, 4, 10]	[$, E, +, (, E]	)$	shift 19
25	[0, 1, 6, 4, 10, 19]	[$, E, +, (, E,)]	$	reduce by F->(E)
26	[0, 1, 6, 3]	[$, E, +, F]	$	reduce by T->F
27	[0, 1, 6, 15]	[$, E, +, T]	$	reduce by E->E+T
28	[0, 1]	[$, E]	$	接受成功

输入字符串为：(num*num)$

Console

<terminated> syntactic_analyzer [Java Application] E:\jre\bin\javaw.exe (2019年11月24日 上午1:43:46)

输入符号串： (num+num)$

步骤	状态栈	符号栈	输入符号流	分析动作
1	[0]	[$]	(num+num)$	shift 4
2	[0, 4]	[$, (]	num+num)$	shift 14
3	[0, 4, 14]	[$, (, num]	+num)$	reduce by F->num
4	[0, 4, 12]	[$, (, F]	+num)$	reduce by T->F
5	[0, 4, 11]	[$, (, T]	+num)$	reduce by E->T
6	[0, 4, 10]	[$, (, E]	+num)$	shift 20
7	[0, 4, 10, 20]	[$, (, E, +]	num)$	shift 14
8	[0, 4, 10, 20, 14]	[$, (, E, +, num]	)$	reduce by F->num
9	[0, 4, 10, 20, 12]	[$, (, E, +, F]	)$	reduce by T->F
10	[0, 4, 10, 20, 25]	[$, (, E, +, T]	)$	reduce by E->E+T
11	[0, 4, 10]	[$, (, E]	)$	shift 19
12	[0, 4, 10, 19]	[$, (, E,)]	$	reduce by F->(E)
13	[0, 3]	[$, F]	$	reduce by T->F
14	[0, 2]	[$, T]	$	reduce by E->T
15	[0, 1]	[$, E]	$	接受成功

输入字符串：(num+num)*num/(num-num)$

Console

<terminated> syntactic_analyzer [Java Application] E:\jre\bin\javaw.exe (2019年11月24日 上午1:45:39)

输入符号串： (num+num)*num/(num-num)$

步骤	状态栈	符号栈	输入符号流	分析动作
1	[0]	[$]	(num+num)*num/(num-num)$	shift 4
2	[0, 4]	[$, (]	num+num)*num/(num-num)$	shift 14
3	[0, 4, 14]	[$, (, num]	+num)*num/(num-num)$	reduce by F->num
4	[0, 4, 12]	[$, (, F]	+num)*num/(num-num)$	reduce by T->F
5	[0, 4, 11]	[$, (, T]	+num)*num/(num-num)$	reduce by E->T
6	[0, 4, 10]	[$, (, E]	+num)*num/(num-num)$	shift 20
7	[0, 4, 10, 20]	[$, (, E, +]	num)*num/(num-num)$	shift 14
8	[0, 4, 10, 20, 14]	[$, (, E, +, num]	)*num/(num-num)$	reduce by F->num
9	[0, 4, 10, 20, 12]	[$, (, E, +, F]	)*num/(num-num)$	reduce by T->F
10	[0, 4, 10, 20, 25]	[$, (, E, +, T]	)*num/(num-num)$	reduce by E->E+T
11	[0, 4, 10]	[$, (, E]	)*num/(num-num)$	shift 19
12	[0, 4, 10, 19]	[$, (, E,)]	*num/(num-num)$	reduce by F->(E)
13	[0, 3]	[$, F]	*num/(num-num)$	reduce by T->F
14	[0, 2]	[$, T]	*num/(num-num)$	shift 8
15	[0, 2, 8]	[$, T, *]	num/(num-num)$	shift 5
16	[0, 2, 8, 5]	[$, T, *, num]	/(num-num)$	reduce by F->num
17	[0, 2, 8, 17]	[$, T, *, F]	/(num-num)$	reduce by T->T*F
18	[0, 2]	[$, T]	/(num-num)$	shift 9
19	[0, 2, 9]	[$, T, /]	(num-num)$	shift 4
20	[0, 2, 9, 4]	[$, T, /, (]	num-num)$	shift 14
21	[0, 2, 9, 4, 14]	[$, T, /, (, num]	-num)$	reduce by F->num
22	[0, 2, 9, 4, 12]	[$, T, /, (, F]	-num)$	reduce by T->F
23	[0, 2, 9, 4, 11]	[$, T, /, (, T]	-num)$	reduce by E->T
24	[0, 2, 9, 4, 10]	[$, T, /, (, E]	-num)$	shift 21
25	[0, 2, 9, 4, 10, 21]	[$, T, /, (, E, -]	num)$	shift 14
26	[0, 2, 9, 4, 10, 21, 14]	[$, T, /, (, E, -, num]	)$	reduce by F->num
27	[0, 2, 9, 4, 10, 21, 12]	[$, T, /, (, E, -, F]	)$	reduce by T->F
28	[0, 2, 9, 4, 10, 21, 29]	[$, T, /, (, E, -, T]	)$	reduce by E->E-T
29	[0, 2, 9, 4, 10]	[$, T, /, (, E]	)$	shift 19
30	[0, 2, 9, 4, 10, 19]	[$, T, /, (, E,)]	$	reduce by F->(E)
31	[0, 2, 9, 18]	[$, T, /, F]	$	reduce by T->T/F
32	[0, 2]	[$, T]	$	reduce by E->T
33	[0, 1]	[$, E]	$	接受成功