Table of Contents

1 Introduction.....................................................................................................................11
  1.1 General.....................................................................................................................11
  1.2 New Go Theory Knowledge.....................................................................................12
  1.3 Characteristics of Semeai Classification.................................................................13
  1.4 Acknowledgements.................................................................................................16

2 Terms and Basic Theory.................................................................................................17
  2.1 Semeai.......................................................................................................................17
  2.2 Essential versus Nonessential..................................................................................17
  2.3 Liberties.....................................................................................................................18
    2.3.1 Physical, Approach and Fighting Liberties.......................................................18
    2.3.2 Outside, Eye, Exclusive and Inside Liberties..................................................23
    2.3.3 Abbreviations.....................................................................................................25
  2.4 Eye...............................................................................................................................26
    2.4.1 Definition.............................................................................................................26
    2.4.2 Stable versus Unstable Eye................................................................................31
    2.4.3 Hot Eye...............................................................................................................32
    2.4.4 Strong versus Weak Eye....................................................................................33
    2.4.5 Almost-filled.......................................................................................................38
    2.4.6 Eye Size, Small Eye and Big Eye.......................................................................39
    2.4.7 Approach Liberties..............................................................................................41
    2.4.8 Overview on Strong Semeai Eyes.....................................................................44
2.4.9 How to Fill.................................................................52
2.5 Attacker and Defender......................................................55
2.6 Favourite versus Underdog......................................................56
2.7 Settled versus Unsettled.......................................................58
2.8 Greater, Equal, Smaller.......................................................59

3 Class 1: Two Basic Groups, No Kos, No Approach Defects..............
.........................................................................................60

3.1 Class 1 Preview.....................................................................60
3.2 Class 1 Definition..................................................................62
3.3 Class 1 Types.......................................................................63
3.4 Type 1 Problems.................................................................65
3.5 Type 1: No Eyes....................................................................66

3.5.1 Common Feature of Cases 1 to 3.................................68
3.5.2 Case 1: Zero Or One Inside Liberties, the Numbers of Outside Approach Liberties are Equal.................................68
3.5.3 Case 2: Zero Or One Inside Liberties, the Numbers of Outside Approach Liberties are Unequal.................................71
3.5.4 Case 3: At least Two Inside Liberties, the Numbers of Outside Approach Liberties are Equal.................................72
3.5.5 Common Features of Cases 4 to 6.................................73
3.5.6 Case 4: At least Two Inside Liberties, the Numbers of Outside Approach Liberties are Unequal, the Numbers of Fighting Liberties are Equal.................................75
3.5.7 Common Features of Cases 5 and 6.................................77
3.5.8 Case 5: At least Two Inside Liberties, the Numbers of Outside Approach Liberties are Unequal, the Favourite has More Fighting Liberties.................................77
Case 6: At least Two Inside Liberties, the Numbers of Outside Approach Liberties are Unequal, the Underdog has More Fighting Liberties

Type 1 Summary

Type 1 Table

Type 1 Answers

Type 2 Problems

Type 2: Each Side has a Small Eye

Common Feature of Cases 1 to 3

Case 1: Zero Inside Liberties, Equal Numbers of Exclusive Approach Liberties

Case 2: Zero Inside Liberties, Unequal Numbers of Exclusive Approach Liberties

Case 3: With Inside Liberties, Equal Numbers of Exclusive Approach Liberties

Common Features of Cases 4 to 6

Case 4: With Inside Liberties, Unequal Numbers of Exclusive Approach Liberties, Equal Number of Fighting Liberties

Case 5: With Inside Liberties, Unequal Numbers of Exclusive Approach Liberties, the Favourite has More Fighting Liberties

Case 6: With Inside Liberties, Unequal Numbers of Exclusive Approach Liberties, the Underdog has More Fighting Liberties

Type 2 Table

Type 2 Answers

Type 3 Problems

Type 3: Each Side has a Big Eye of the Same Size
<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.14.1</td>
<td>Common Feature of Cases 1 to 3</td>
<td>111</td>
</tr>
<tr>
<td>3.14.2</td>
<td>Case 1: Zero Inside Liberties, Equal Numbers of Exclusive Approach Liberties</td>
<td>112</td>
</tr>
<tr>
<td>3.14.3</td>
<td>Case 2: Zero Inside Liberties, Unequal Numbers of Exclusive Approach Liberties</td>
<td>115</td>
</tr>
<tr>
<td>3.14.4</td>
<td>Case 3: With Inside Liberties, Equal Numbers of Exclusive Approach Liberties</td>
<td>117</td>
</tr>
<tr>
<td>3.14.5</td>
<td>Common Features of Cases 4 to 6</td>
<td>120</td>
</tr>
<tr>
<td>3.14.6</td>
<td>Case 4: With Inside Liberties, Unequal Numbers of Exclusive Approach Liberties, Equal Number of Fighting Liberties</td>
<td>120</td>
</tr>
<tr>
<td>3.14.7</td>
<td>Case 5: With Inside Liberties, Unequal Numbers of Exclusive Approach Liberties, the Favourite has More Fighting Liberties</td>
<td>124</td>
</tr>
<tr>
<td>3.14.8</td>
<td>Case 6: With Inside Liberties, Unequal Numbers of Exclusive Approach Liberties, the Underdog has More Fighting Liberties</td>
<td>127</td>
</tr>
<tr>
<td>3.15</td>
<td>Types 2 and 3 Summary</td>
<td>130</td>
</tr>
<tr>
<td>3.16</td>
<td>Type 3 Table</td>
<td>132</td>
</tr>
<tr>
<td>3.17</td>
<td>Types 2 and 3 Table</td>
<td>133</td>
</tr>
<tr>
<td>3.18</td>
<td>Type 3 Answers</td>
<td>134</td>
</tr>
<tr>
<td>3.19</td>
<td>Type 4 Problems</td>
<td>140</td>
</tr>
<tr>
<td>3.20</td>
<td>Type 4: One Side has an Eye</td>
<td>141</td>
</tr>
<tr>
<td>3.20.1</td>
<td>Case 1: The Numbers of Fighting Liberties are Equal</td>
<td>142</td>
</tr>
<tr>
<td>3.20.2</td>
<td>Common Features of Cases 2 and 3</td>
<td>147</td>
</tr>
<tr>
<td>3.20.3</td>
<td>Case 2: The Favourite has More Fighting Liberties</td>
<td>147</td>
</tr>
<tr>
<td>3.20.4</td>
<td>Case 3: The Underdog has More Fighting Liberties</td>
<td>148</td>
</tr>
<tr>
<td>3.21</td>
<td>Type 4 Summary</td>
<td>151</td>
</tr>
</tbody>
</table>
3.22 Type 4 Table

3.23 Type 4 Answers

3.24 Type 5 Problems

3.25 Type 5: One Side has a Big Eye, the Other Side has a Smaller Eye

3.25.1 Case 1: The Numbers of Fighting Liberties are Equal

3.25.2 Common Features of Cases 2 and 3

3.25.3 Case 2: The Favourite has More Fighting Liberties

3.25.4 Case 3: The Underdog has More Fighting Liberties

3.26 Type 5 Summary

3.27 Type 5 Table

3.28 Types 4 and 5 Summary

3.29 Types 4 and 5 Table

3.30 Type 5 Answers

3.31 Class 1 Problems

3.32 Class 1 Answers

3.33 Class 1 All Types Summary

3.34 Class 1 All Types Table

3.35 Class 1 All Types Comparison

3.35.1 Types 1 to 3

3.35.2 Types 4 and 5

3.35.3 Checklist
New Semeai Formula

Class 2: Like Class 1 with a Ring

Class 2 Types and Cases

Type 1 Case 7

Class 2 All Types Table

Class 3: Like Class 1, Essential String with a Big Eye in Atari

Type 3: Each Side has a Big Eye of the Same Size

Case 1: Both Essential Strings in Atari

Case 2: Only the Underdog's Essential String in Atari

Type 4: One Side has a Big Eye

Case 1: The Favourite has at least as Many Exclusive Approach Liberties as the Underdog

Case 2: The Underdog has More Exclusive Approach Liberties

Type 5: One Side has a Big Eye, the Other Side has a Smaller Eye

Case 1: Both Essential Strings are in Atari

Case 2: Only the Underdog's Essential String in Atari

Case 3: Only the Favourite's Essential String in Atari, the Favourite has at least as Many Exclusive Approach Liberties as the Underdog

Case 4: Only the Favourite's Essential String in Atari, the Underdog has More Exclusive Approach Liberties

Class 3 All Types Table
7 Class 4: Like Class 1 with One Unstable Eye

7.1 Type 2: Each Side has a Small Eye

7.2 Type 3: Each Side has a Big Eye of the Same Size

7.3 Type 4: One Side has an Eye

7.4 Type 5: One Side has a Big Eye, the Other Side has a Smaller Eye

7.5 Class 4 All Types Table

8 Class 5: Like Class 1 with Two Initially Unstable Eyes

8.1 Type 2: Each Side has a Small Eye

8.2 Type 3: Each Side has a Big Eye of the Same Size

8.3 Type 5: One Side has a Big Eye, the Other Side has a Smaller Eye

8.4 Class 5 All Types Table

9 Class 6: Like Class 1 with at least One Essential String with a Big Eye in Atari and at least One Unstable Eye

9.1 Case 1: Both Sides are in Atari and at least One Side is Unstable

9.2 Case 2: The Defender is in Atari and Both Sides are Unstable

9.3 Case 3: Only the Defender is in Atari and Unstable

9.4 Case 4: The Defender is in Atari, the Attacker is Unstable and the Defender has at least as Many Exclusive Approach Liberties as the Attacker

9.5 Case 5: The Defender is in Atari, the Attacker is Unstable and the Defender has Fewer Exclusive Approach Liberties than the Attacker

9.6 Class 6 All Cases Table
10 Correcting Mistakes in Literature.................................................253

10.1 Forced Liberties........................................................................253

10.2 The Article "Die Semeai-Formel"..............................................257

10.3 Eye Status................................................................................259

10.4 The Research Paper "Race to Capture: Analyzing Semeai in Go"... ............................................................259

10.4.1 Wrong Assumptions............................................................259

10.4.2 Minor Mistake.......................................................................260

10.5 The Book "Counting Liberties and Winning Capturing Races"....... .............................................................................261

10.5.1 Too General "Inside Liberties Protect the Underdog".........261

10.5.2 Mistake "Equal Liberty Counts Indicate an Unsettled Semeai" .............................................................................263

10.5.3 Too General "Outside Liberties First, Inside Liberties Last" .............................................................................263

11 Literature.....................................................................................269

12 Index.........................................................................................271