

## Table of Contents

Introduction	vi
1. LOCAL THEORY	
1.1.1. Notations	1
1.1.2. The norm map	2
1.1.3. Local v. global	5
1.1.4. Galois cohomology	6
1.2.1. $G(F)$ -families	9
1.2.2. Twisted $G(F)$ -families	12
1.2.3. Matching orbital integrals	13
1.2.4. End of proof	18
1.2.5. Reformulation	20
1.2.6. Spherical functions	22
1.3.1. Classification	24
1.3.2. Twisted characters	26
1.3.3. Induced representations	27
1.3.4. Local lifting	31
1.4.1. Orthogonality relations	34
1.4.2. Supercuspidals	36
1.4.3. Twisted orthogonality relations	38
1.5.1. Split places	41
1.5.2. Matching functions	42
1.5.3. Lifting representations	43
1.5.4. Weighted integrals	45
1.5.5. Matching operators	46
2. THE TRACE FORMULA	
2.1.1. Introduction	49
2.1.2. Measures	51
2.1.3. The map $H$	52
2.2.1. The distribution $J_0$	54
2.2.2. Elliptic terms	56
2.2.3. Quadratic terms	57
2.3.1. Correction for $GL(2)$	59
2.3.2. The correction	63
2.3.3. Singular classes	66
2.3.4. The term $\sum_f I_0(f)$	68
2.4.1.-2.4.4. Proof of Lemma 3	71
2.5.1.-2.5.6. Proof of Lemma 4	78
2.6.1.-2.6.3. Integration lemma	88
2.7.1. Asymptotic behavior	95
2.7.2. At $h = 1$	96
2.7.3. Division algebras	98

### 3. THE TWISTED TRACE FORMULA

3.1.1.	Introduction	100
3.1.2.	The twisted distribution $J_0$	102
3.1.3.	Elliptic terms	103
3.1.4.	Quadratic terms	104
3.2.1.	Twisted correction for $GL(2, E)$	109
3.2.2.	Twisted correction for $GL(3, E)$	112
3.2.3.	Singular twisted classes	116
3.2.4.	The term $\sum_0 I_0(\phi)$	118
3.3.1.	Proof of Lemma 7	121
3.3.2.	Final contribution	124
3.4.1.	Asymptotic behavior for $GL(2, E)$	125
3.4.2.	Asymptotic behavior for $GL(3, E)$	127

### 4. THE CONTINUOUS SPECTRUM

4.1.1.	Notations	129
4.1.2.	Kernels	131
4.2.1.	The $I_X(f)$ and $I_X(\phi)$	135
4.2.1.(a)	$P_X = \{G\}$	135
4.2.1.(b)	$P_X = \{P_1\}$	136
4.2.1.(c)	$P_X = \{P_0\}$ , $A' = A_0$	138
4.2.1.(c)	$P_X = \{P_0\}$ , $A' = A_1$	139
4.2.1.(c)	$P_X = \{P_0\}$ , $A' = Z$	142
4.2.2.	Reformulation	143
4.3.1.	The Hecke algebra	147
4.3.2.	The discrete series	149
4.3.3.	A sum	151

### 5. EQUALITY OF TRACES

5.1.1.	Elliptic terms	153
5.1.2.	Back to $GL(2)$	154
5.1.3.	Excluding the place $v_0$	156
5.1.4.	Split terms	158
5.2.1.	Quadratic terms	162
5.2.2.	Local quadratic tori	166
5.2.3.	Last quadratic terms	169
5.3.1.	An integral expression	173
5.4.1.	Traces identity	177
5.4.2.	End of proof	180
5.4.3.	Reformulation	181

## 6. THE CORRESPONDENCE

6.1.1. Lifting $\pi(\theta)$ 's	183
6.2.1. Linear independence	186
6.2.2. Deleting places	190
6.2.3. A single place	192
6.3.1. Existence lemma	196
6.3.2. The lifting theorems	198
<b>REFERENCES</b>	200
Index of terminology	201
Index of notations	203