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1974), (1999), (1995), (1986), (1987), (1993), (1998), (1998), (2000), (2004),

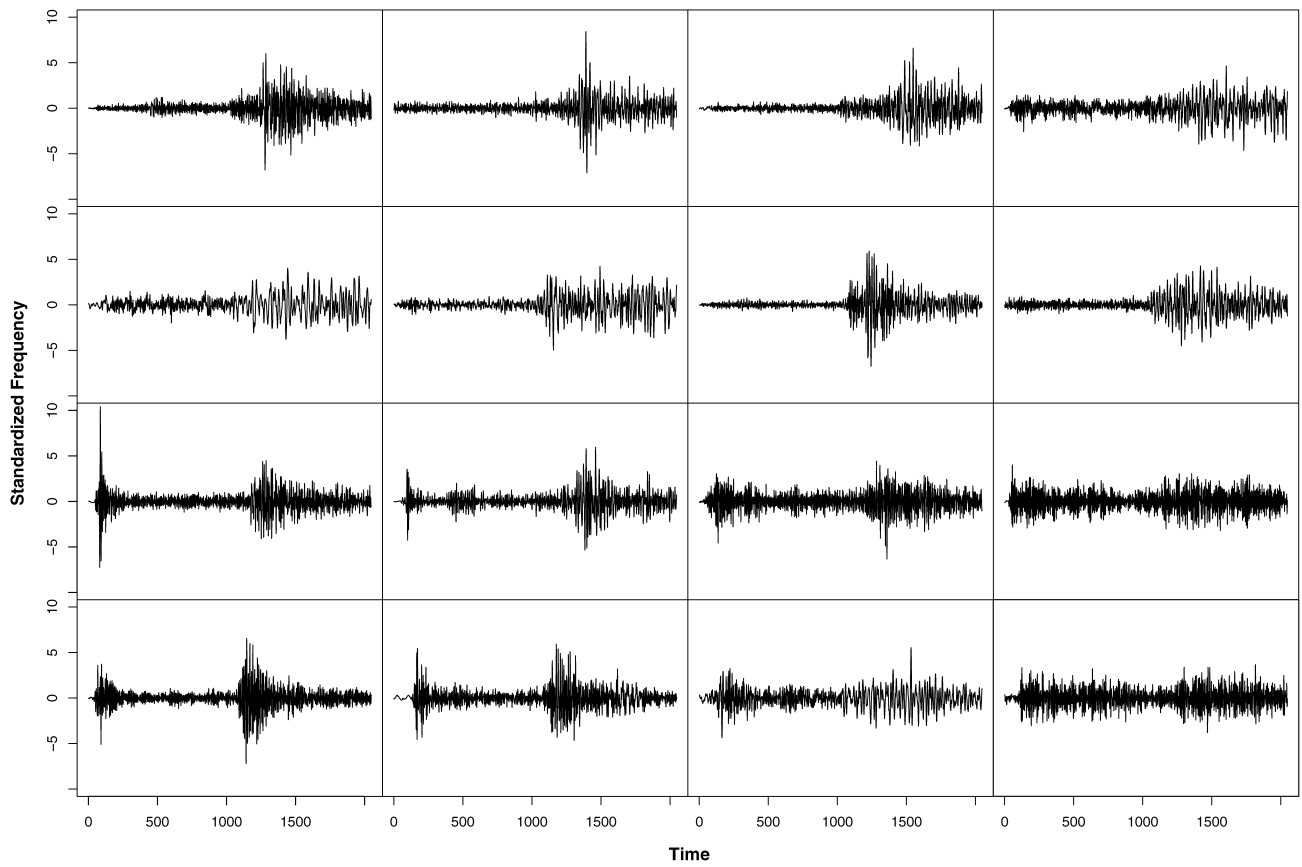
$$Y_j = g(t_j) + e_j(t_j), \quad j = 1, \dots, J,$$

$H(t_j)_{j=1, \dots, J}$, $v(t_j) = (e_j(t_j))$, (X, Y) , $v(x) = E(Y^2|X=x) - [E(Y|X=x)]^2$.

H 95616 (mueller@wald.ucdavis.edu).

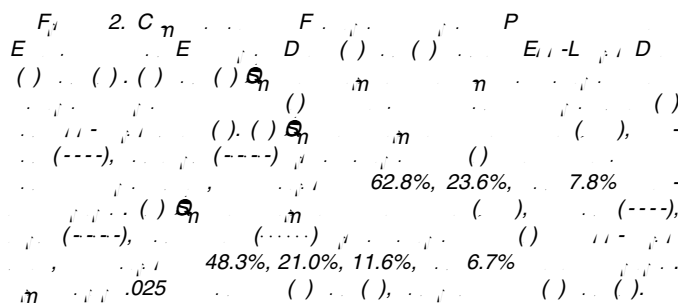
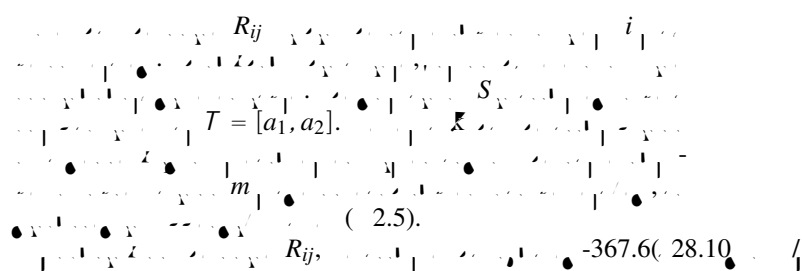
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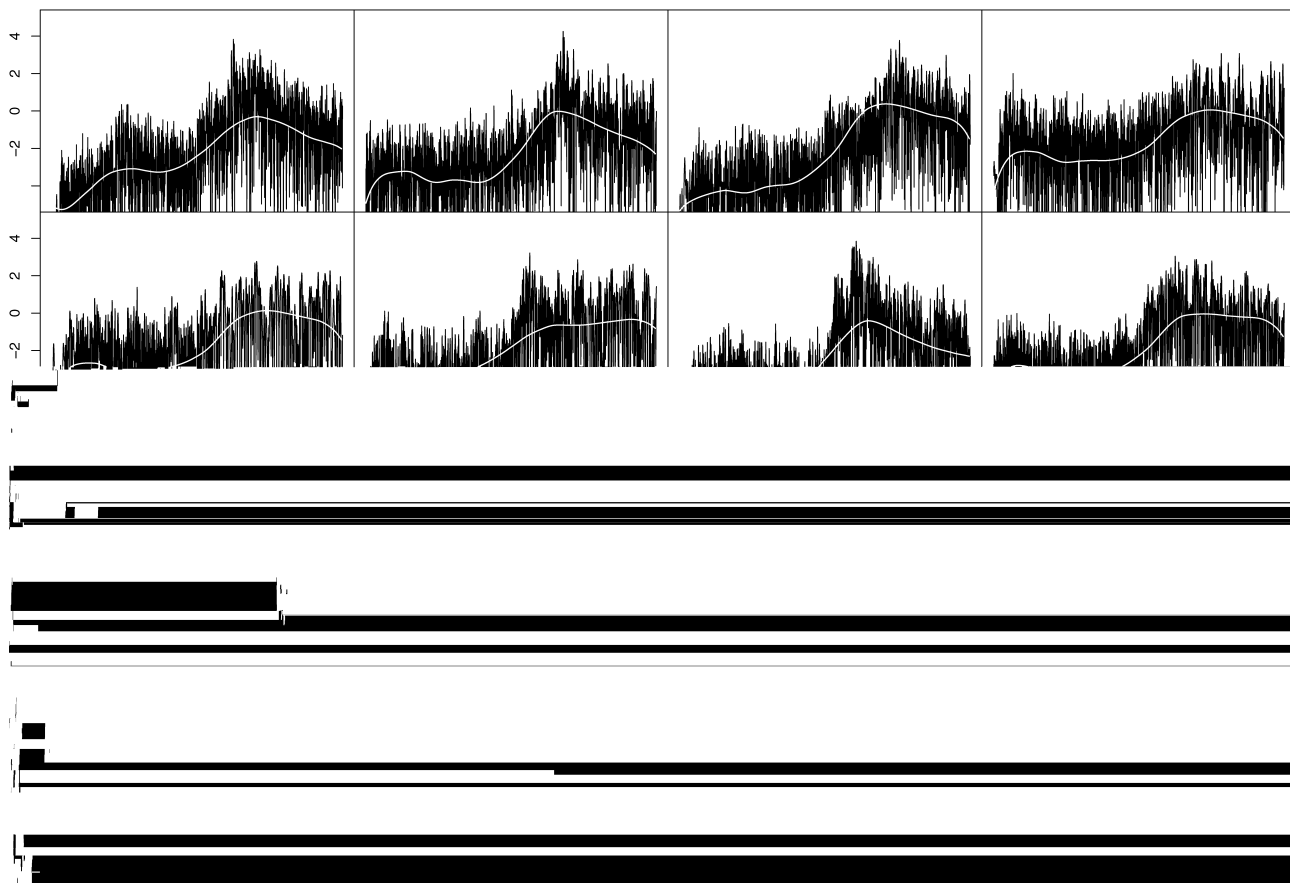
F_T, 1. D E_T Q ... E ... (), Q ... Q ... E ... () n^{1/2}
), O ... E ... (n^{1/2}). m025 ... n^{1/2}

1986). (1950), (1958), 1991; 1992; 2001; 2003). 2.



$$X_{ij} = S_i(t_{ij}) + R_{ij}, \quad i = 1, \dots, n, j = 1, \dots, m. \quad (1)$$

$$ER_{ij} = 0, \quad (R_{ij}) = \frac{2}{R_{ij}} < \infty.$$


$$F_{ij} = E_{ij} + \frac{1}{2} R^2(\cdot) (\cdot) \cdot E_{im} \quad F_{ij} = P_{ij} + \frac{1}{2} R^2(\cdot) (\cdot) \cdot E_{ij} \quad (13)$$
[illegible]

$$\hat{V}_i(t) = \hat{\mu}_V(t) + \sum_{k=1}^M \hat{v}_{ik}(t). \quad (13)$$

1. $\mathcal{H}^1(\mathbb{R}^n) \subset \mathcal{H}^1(\mathbb{R}^n)$ 3.

4. ~~AQ~~ MP O IC RE~~Q~~ L ~~S~~

[illegible]

$$Z_{ij} = \begin{cases} 1 & \text{if } i \text{ and } j \text{ are connected} \\ 0 & \text{otherwise} \end{cases} \quad (3)$$

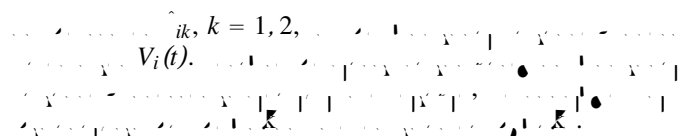
$$b_S \parallel S_i \quad (i=1, \dots, n) \quad (1)$$

$$\begin{aligned} & \quad b_{S,i}, \\ & \quad b_S, \end{aligned} \quad (2.1), \quad b_S, \quad (2.2);$$
$$h_V, \quad b_{QV}, \quad \mu_V \quad (2.3), \quad (2.5).$$
$$\hat{G}_V(s,t) \quad (2.7), \quad \hat{Q}_V(t) \quad (2.8).$$

$\mathcal{M} = \{M_1, \dots, M_m\}$

Theorem 1. Let $(-1, -2), (-1, 1), (-2, 1), (-2, 2)$ be the four vertices of a square in the plane. Let $\hat{S}_i(t)$ be the solution of the system

$$E\left(\frac{1}{\sqrt{\mathcal{T}}}|\hat{S}_i(t) - S_i(t)|\right) = O\left(b_S^2 + \frac{1}{\overline{m}b_S}\right). \quad (14)$$



$\frac{1}{\sqrt{\pi}} \int_{-\infty}^{\infty} f(x) e^{-x^2} dx = \frac{1}{\sqrt{\pi}} \int_{-\infty}^{\infty} f(x) e^{-x^2} dx$

$$\frac{(X_{ij} - \hat{S}_i(t_{ij}))^2}{\hat{R}_{ij}^2} \sim 0, \quad \text{if } \frac{X_{ij} - \hat{S}_i(t_{ij})}{\hat{R}_{ij}} \leq 0.001 \quad \text{and} \quad \frac{X_{ij} - \hat{S}_i(t_{ij})}{\hat{R}_{ij}} \geq 0.001$$
$$V_i = \begin{cases} 1 & \text{if } i \in \{1, 2, \dots, n\} \\ 0 & \text{if } i \in \{n+1, n+2, \dots, 2n\} \end{cases}$$

$\mathcal{X} = \{X_1, \dots, X_n\}$ is a set of n independent and identically distributed (i.i.d.) samples from a distribution \mathcal{P} . The empirical distribution $\hat{\mathcal{P}}$ is defined as $\hat{\mathcal{P}} = \frac{1}{n} \sum_{i=1}^n \delta_{X_i}$, where δ_X is the Dirac delta function. The empirical distribution $\hat{\mathcal{P}}$ is a probability measure on \mathcal{X} . The empirical distribution $\hat{\mathcal{P}}$ is a probability measure on \mathcal{X} . The empirical distribution $\hat{\mathcal{P}}$ is a probability measure on \mathcal{X} .

$$ik, k = 1, 2, i = 1, \dots, 15 \quad (5),$$
[illegible]

1991, 2003)

$$S_i = \frac{V_i}{\sum_{i=1}^n V_i} \quad (4)$$
$$V_i = \frac{1}{\sigma} \left(\sum_{j=1}^n x_j^2 + \sum_{j=1}^m y_j^2 \right) \quad (1)$$

Let \mathcal{S} be a set of n points in the plane, and let \mathcal{H} be a set of m halfplanes. We consider the problem of determining the number of points in \mathcal{S} that lie in the intersection of the halfplanes in \mathcal{H} . This problem is known as the *halfplane range counting* problem. We show that this problem can be solved in $O(n \log m)$ time.

(11.3) $\mathcal{A} \in \mathcal{A}(\mathcal{C})$ is a \mathcal{C} -algebra if and only if \mathcal{A} is a \mathcal{C} -algebra and $\mathcal{A} \in \mathcal{A}(\mathcal{C})$.

[illegible]
$$S_1 = 7 \frac{1}{2} \left(1 + \frac{1}{15} \right),$$

1. $\frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$
 2. $\frac{1}{2} \times \frac{1}{4} = \frac{1}{8}$
 3. $\frac{1}{4} \times \frac{1}{4} = \frac{1}{16}$
 4. $\frac{1}{2} \times \frac{1}{8} = \frac{1}{16}$
 5. $\frac{1}{4} \times \frac{1}{8} = \frac{1}{32}$
 6. $\frac{1}{8} \times \frac{1}{8} = \frac{1}{64}$
 7. $\frac{1}{2} \times \frac{1}{16} = \frac{1}{32}$
 8. $\frac{1}{4} \times \frac{1}{16} = \frac{1}{64}$
 9. $\frac{1}{8} \times \frac{1}{16} = \frac{1}{128}$
 10. $\frac{1}{2} \times \frac{1}{32} = \frac{1}{64}$
 11. $\frac{1}{4} \times \frac{1}{32} = \frac{1}{128}$
 12. $\frac{1}{8} \times \frac{1}{32} = \frac{1}{256}$
 13. $\frac{1}{2} \times \frac{1}{64} = \frac{1}{32}$
 14. $\frac{1}{4} \times \frac{1}{64} = \frac{1}{256}$
 15. $\frac{1}{8} \times \frac{1}{64} = \frac{1}{512}$
 16. $\frac{1}{2} \times \frac{1}{128} = \frac{1}{64}$
 17. $\frac{1}{4} \times \frac{1}{128} = \frac{1}{512}$
 18. $\frac{1}{8} \times \frac{1}{128} = \frac{1}{1024}$
 19. $\frac{1}{2} \times \frac{1}{256} = \frac{1}{128}$
 20. $\frac{1}{4} \times \frac{1}{256} = \frac{1}{1024}$
 21. $\frac{1}{8} \times \frac{1}{256} = \frac{1}{2048}$
 22. $\frac{1}{2} \times \frac{1}{512} = \frac{1}{256}$
 23. $\frac{1}{4} \times \frac{1}{512} = \frac{1}{2048}$
 24. $\frac{1}{8} \times \frac{1}{512} = \frac{1}{4096}$
 25. $\frac{1}{2} \times \frac{1}{1024} = \frac{1}{512}$
 26. $\frac{1}{4} \times \frac{1}{1024} = \frac{1}{4096}$
 27. $\frac{1}{8} \times \frac{1}{1024} = \frac{1}{8192}$
 28. $\frac{1}{2} \times \frac{1}{2048} = \frac{1}{1024}$
 29. $\frac{1}{4} \times \frac{1}{2048} = \frac{1}{8192}$
 30. $\frac{1}{8} \times \frac{1}{2048} = \frac{1}{16384}$
 31. $\frac{1}{2} \times \frac{1}{4096} = \frac{1}{2048}$
 32. $\frac{1}{4} \times \frac{1}{4096} = \frac{1}{16384}$
 33. $\frac{1}{8} \times \frac{1}{4096} = \frac{1}{32768}$
 34. $\frac{1}{2} \times \frac{1}{8192} = \frac{1}{4096}$
 35. $\frac{1}{4} \times \frac{1}{8192} = \frac{1}{32768}$
 36. $\frac{1}{8} \times \frac{1}{8192} = \frac{1}{65536}$
 37. $\frac{1}{2} \times \frac{1}{16384} = \frac{1}{8192}$
 38. $\frac{1}{4} \times \frac{1}{16384} = \frac{1}{65536}$
 39. $\frac{1}{8} \times \frac{1}{16384} = \frac{1}{131072}$
 40. $\frac{1}{2} \times \frac{1}{32768} = \frac{1}{16384}$
 41. $\frac{1}{4} \times \frac{1}{32768} = \frac{1}{131072}$
 42. $\frac{1}{8} \times \frac{1}{32768} = \frac{1}{262144}$
 43. $\frac{1}{2} \times \frac{1}{65536} = \frac{1}{32768}$
 44. $\frac{1}{4} \times \frac{1}{65536} = \frac{1}{262144}$
 45. $\frac{1}{8} \times \frac{1}{65536} = \frac{1}{524288}$
 46. $\frac{1}{2} \times \frac{1}{131072} = \frac{1}{65536}$
 47. $\frac{1}{4} \times \frac{1}{131072} = \frac{1}{524288}$
 48. $\frac{1}{8} \times \frac{1}{131072} = \frac{1}{1048576}$
 49. $\frac{1}{2} \times \frac{1}{262144} = \frac{1}{131072}$
 50. $\frac{1}{4} \times \frac{1}{262144} = \frac{1}{1048576}$
 51. $\frac{1}{8} \times \frac{1}{262144} = \frac{1}{2097152}$
 52. $\frac{1}{2} \times \frac{1}{524288} = \frac{1}{262144}$
 53. $\frac{1}{4} \times \frac{1}{524288} = \frac{1}{2097152}$
 54. $\frac{1}{8} \times \frac{1}{524288} = \frac{1}{4194304}$
 55. $\frac{1}{2} \times \frac{1}{1048576} = \frac{1}{524288}$
 56. $\frac{1}{4} \times \frac{1}{1048576} = \frac{1}{4194304}$
 57. $\frac{1}{8} \times \frac{1}{1048576} = \frac{1}{8388608}$
 58. $\frac{1}{2} \times \frac{1}{2097152} = \frac{1}{1048576}$
 59. $\frac{1}{4} \times \frac{1}{2097152} = \frac{1}{8388608}$
 60. $\frac{1}{8} \times \frac{1}{2097152} = \frac{1}{16777216}$
 61. $\frac{1}{2} \times \frac{1}{4194304} = \frac{1}{2097152}$
 62. $\frac{1}{4} \times \frac{1}{4194304} = \frac{1}{16777216}$
 63. $\frac{1}{8} \times \frac{1}{4194304} = \frac{1}{33554432}$
 64. $\frac{1}{2} \times \frac{1}{8388608} = \frac{1}{4194304}$
 65. $\frac{1}{4} \times \frac{1}{8388608} = \frac{1}{33554432}$
 66. $\frac{1}{8} \times \frac{1}{8388608} = \frac{1}{67108864}$
 67. $\frac{1}{2} \times \frac{1}{16777216} = \frac{1}{8388608}$
 68. $\frac{1}{4} \times \frac{1}{16777216} = \frac{1}{67108864}$
 69. $\frac{1}{8} \times \frac{1}{16777216} = \frac{1}{33554432}$
 70. $\frac{1}{2} \times \frac{1}{33554432} = \frac{1}{16777216}$
 71. $\frac{1}{4} \times \frac{1}{33554432} = \frac{1}{268435456}$
 72. $\frac{1}{8} \times \frac{1}{33554432} = \frac{1}{536870912}$
 73. $\frac{1}{2} \times \frac{1}{67108864} = \frac{1}{33554432}$
 74. $\frac{1}{4} \times \frac{1}{67108864} = \frac{1}{268435456}$
 75. $\frac{1}{8} \times \frac{1}{67108864} = \frac{1}{536870912}$
 76. $\frac{1}{2} \times \frac{1}{131072} = \frac{1}{65536}$
 77. $\frac{1}{4} \times \frac{1}{131072} = \frac{1}{1048576}$
 78. $\frac{1}{8} \times \frac{1}{131072} = \frac{1}{2097152}$
 79. $\frac{1}{2} \times \frac{1}{262144} = \frac{1}{131072}$
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 84. $\frac{1}{8} \times \frac{1}{524288} = \frac{1}{2097152}$
 85. $\frac{1}{2} \times \frac{1}{1048576} = \frac{1}{524288}$
 86. $\frac{1}{4} \times \frac{1}{1048576} = \frac{1}{1048576}$
 87. $\frac{1}{8} \times \frac{1}{1048576} = \frac{1}{2097152}$
 88. $\frac{1}{2} \times \frac{1}{2097152} = \frac{1}{1048576}$
 89. $\frac{1}{4} \times \frac{1}{2097152} = \frac{1}{2097152}$
 90. $\frac{1}{8} \times \frac{1}{2097152} = \frac{1}{4194304}$
 91. $\frac{1}{2} \times \frac{1}{4194304} = \frac{1}{2097152}$
 92. $\frac{1}{4} \times \frac{1}{4194304} = \frac{1}{4194304}$
 93. $\frac{$

$\mathcal{S}_1 = \{S_1, S_2, S_3, S_4, S_5, S_6, S_7, S_8, S_9, S_{10}, S_{11}, S_{12}, S_{13}, S_{14}, S_{15}, S_{16}, S_{17}, S_{18}, S_{19}, S_{20}, S_{21}, S_{22}, S_{23}, S_{24}, S_{25}, S_{26}, S_{27}, S_{28}, S_{29}, S_{30}, S_{31}, S_{32}, S_{33}, S_{34}, S_{35}, S_{36}, S_{37}, S_{38}, S_{39}, S_{40}, S_{41}, S_{42}, S_{43}, S_{44}, S_{45}, S_{46}, S_{47}, S_{48}, S_{49}, S_{50}, S_{51}, S_{52}, S_{53}, S_{54}, S_{55}, S_{56}, S_{57}, S_{58}, S_{59}, S_{60}, S_{61}, S_{62}, S_{63}, S_{64}, S_{65}, S_{66}, S_{67}, S_{68}, S_{69}, S_{70}, S_{71}, S_{72}, S_{73}, S_{74}, S_{75}, S_{76}, S_{77}, S_{78}, S_{79}, S_{80}, S_{81}, S_{82}, S_{83}, S_{84}, S_{85}, S_{86}, S_{87}, S_{88}, S_{89}, S_{90}, S_{91}, S_{92}, S_{93}, S_{94}, S_{95}, S_{96}, S_{97}, S_{98}, S_{99}, S_{100}\}$

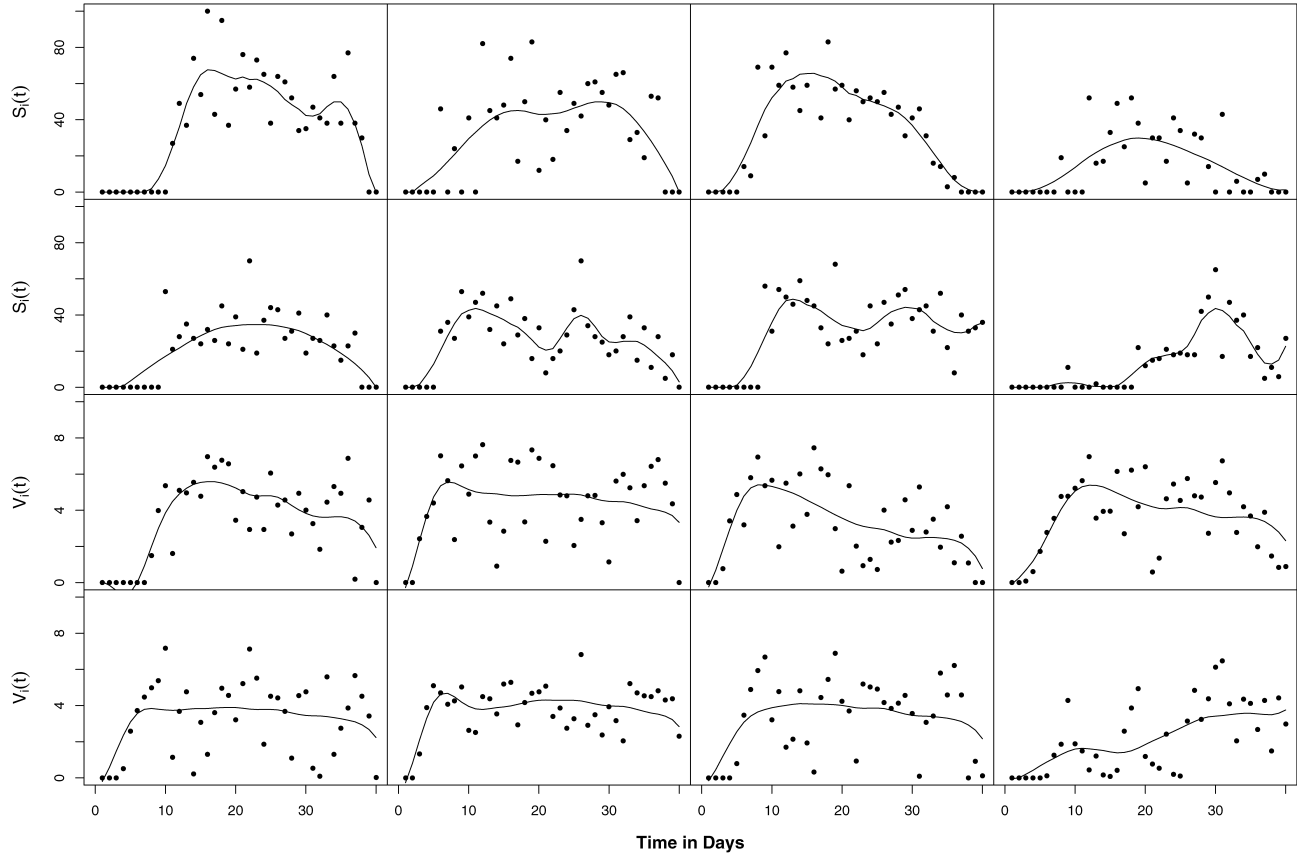
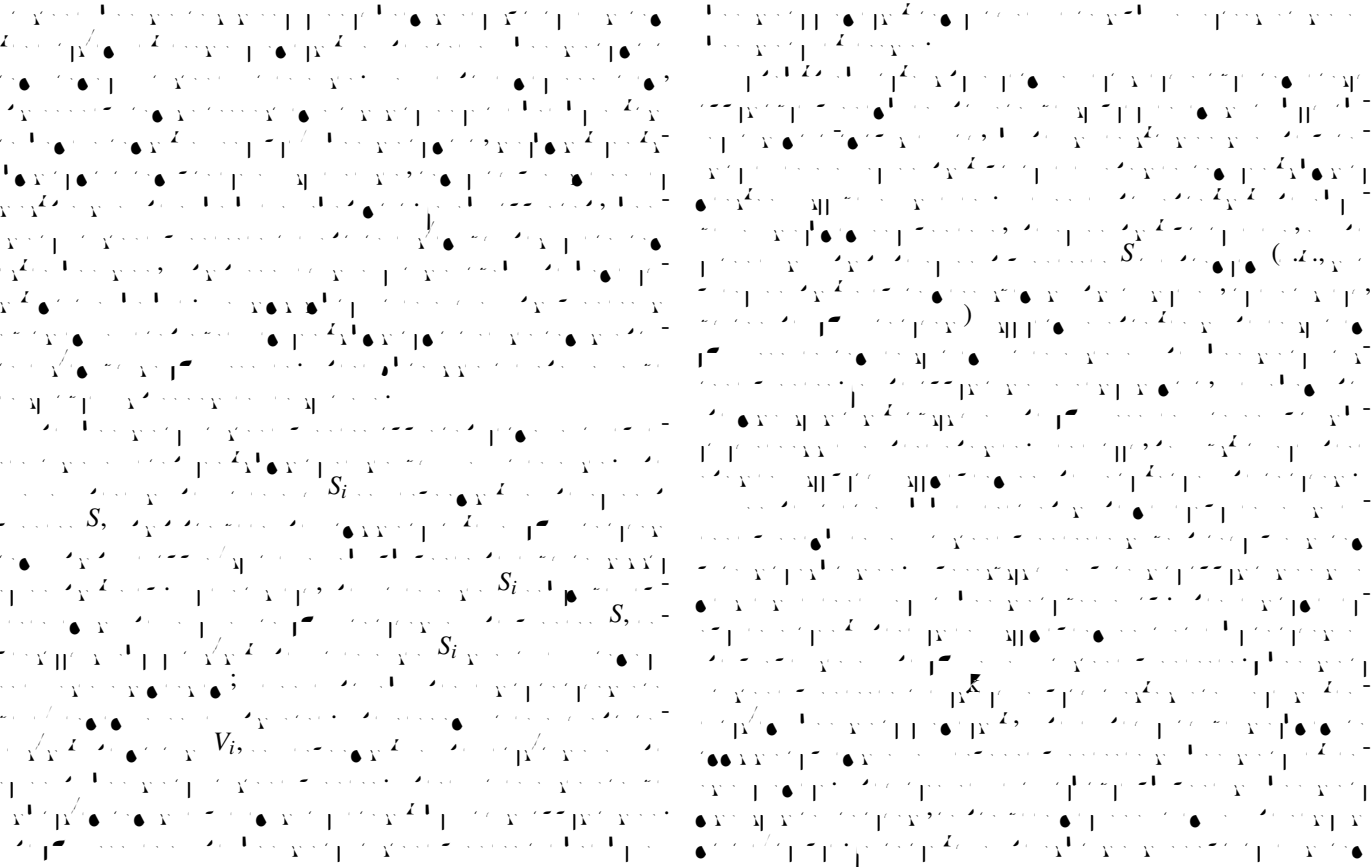


Figure 5. Time series plots of the number of susceptible ($S(t)$) and vaccinated ($V(t)$) individuals over 40 days. The plots show the observed data (dots) and the fitted model (solid line). The model parameters are estimated from the data. The fitted model is given by the equation $S(t) = S_0 e^{-\beta I(t)} e^{-\gamma t}$ and $V(t) = V_0 e^{-\beta I(t)} e^{-\gamma t}$, where S_0 and V_0 are the initial conditions, β is the transmission rate, and γ is the recovery rate. The fitted model is given by the equation $S(t) = S_0 e^{-\beta I(t)} e^{-\gamma t}$ and $V(t) = V_0 e^{-\beta I(t)} e^{-\gamma t}$, where S_0 and V_0 are the initial conditions, β is the transmission rate, and γ is the recovery rate.



1(·) · 2(·) = 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838,

$$\sum_{i=1}^m \frac{1}{b_{S,i}} \left(\frac{t_{ij} - t}{b_{S,i}} \right) \{X_{ij} - \mu_{i,0} - \mu_{i,1}(t - t_{ij})\}^2 \quad (1)$$

$$\sum_{i=1}^n \sum_{j=1}^m \left(\frac{t_{ij} - t}{b_V} \right) \{ \hat{Z}_{ij} - 0 - 1(t - t_{ij}) \}^2 \quad (.2)$$

$$f(s, t, (t_{ij1}, t_{ij2})) = 0 + 11(s - t_{ij1}) + 12(t - t_{ij2}),$$

$$M_{ik} = \frac{1}{n} \sum_{j=1}^n \frac{\lambda_j}{\lambda_j + i} \left(\frac{1}{\lambda_j} - \frac{1}{\lambda_j + i} \right) \quad (8)$$

$$\hat{\epsilon}_{ik} = \sum_{j=2}^m (\hat{Z}_{ij} - \hat{\mu}_{IV}(t_{ij})) \hat{\epsilon}_k(t_{ij})(t_{ij} - t_{i,j-1}),$$

$$i = 1, \dots, n, k = 1, \dots, M. \quad (5)$$

$$V(M) = \sum_{i=1}^n \sum_{j=1}^m \{ \hat{Z}_{ij} - \hat{V}_i^{(-i)}(t_{ij}) \}^2, \quad (4.6)$$

$$(4.5) \quad \frac{d}{dt} \|V_i\|_{L^2(\Omega)}^2 + \frac{\alpha}{2} \|V_i\|_{L^2(\Omega)}^2 = -\frac{\beta}{2} \|V_i\|_{L^2(\Omega)}^2 + \frac{\gamma}{2} \|V_i\|_{L^2(\Omega)}^2$$

$$\hat{\gamma}_W^2 = \frac{1}{|T_1|} \int_{T_1} \{\hat{Q}_V(t) - \hat{G}_V(t)\}_+ dt \quad (.7)$$

$\hat{w}^2 > 0$ $\hat{w}^2 = 0$ $|T|/4$ (2003).

[illegible]

(1) $\lim_{t \rightarrow \infty} \frac{1}{t} \ln \frac{1}{\|x(t)\|} = C > 0$ and $\lim_{t \rightarrow \infty} \frac{1}{t} \ln \frac{1}{\|y(t)\|} = C > 0$.

$$\begin{aligned} & \sup_t |S^{(j)}(t)| < C, \quad j = 0, 1, 2, \dots, \\ & \sup_t |V(t)| < C. \end{aligned}$$

$$b_{S,i} = b_{S,i}(n), \quad b_V = b_V(n), \quad h_V = h_V(n), \quad \dots$$

$$(2.1) \quad \begin{aligned} & \text{Let } \{b_{S,i}\}_{i=1}^{\infty} \text{ be a sequence of positive real numbers such that } \sum_{i=1}^{\infty} b_{S,i} = 1 \\ & \text{and } 0 < c_1 < \dots < i b_{S,i} / b_S \leq 1 - i b_{S,i} / b_S < c_2 < \dots \end{aligned}$$

$$(2.2) \quad m = \frac{1}{2} \left(\frac{1}{\lambda_1} + \frac{1}{\lambda_2} \right), b_S = 0, \dots, mb_S^2 = \frac{1}{2} \left(\frac{1}{\lambda_1} - \frac{1}{\lambda_2} \right).$$

$$(2.3) \quad b_V = 0, b_{Q_V} = 0, nb_V^4, nb_{Q_V}^4, \quad |V| = n \times n \\ b_V^6 < \dots, nb_V^6 < \dots$$

$$(2.4) \quad h_V = 0, nh_V^6 \rightarrow \infty, nh_V^8 < \infty.$$

$$(2.5) \quad \begin{aligned} & \|u\|_{L^2(\mathbb{R}^n)} \leq n^{1/2} b_{YM} m^{-1} < \infty, \quad \|u\|_{L^2(\mathbb{R}^n)} \leq n^{1/2} b_{QV} m^{-1} < \infty, \\ & \|u\|_{L^2(\mathbb{R}^n)} \leq n^{1/2} h_{YM} m^{-1} < \infty. \end{aligned}$$

$$\{t_{ij}\}_{i=1,\dots,n;j=1,\dots,m} \quad \text{with } t_{ij} \in \mathbb{R}^n, \quad \text{with } t_{ij} \in \mathbb{R}^n, \quad \text{with } t_{ij} \in \mathbb{R}^n$$

[illegible]

$$i = j = 1, \dots, m-1, t_{ij} < t_{i,j+1} \dots$$

$$f \geq 0, \quad \int_{\mathcal{I}} f(t) dt = 1, \quad t \in \mathcal{I} \Rightarrow \mathcal{I} f(t) > 0, \quad t \in \mathcal{I},$$

$$F(t) = \int_{a_1}^t f(s) ds.$$

1. *Chrysomelidae* (10 species)
 2. *Curculionidae* (10 species)
 3. *Chrysomelidae* (10 species)
 4. *Chrysomelidae* (10 species)
 5. *Chrysomelidae* (10 species)
 6. *Chrysomelidae* (10 species)
 7. *Chrysomelidae* (10 species)
 8. *Chrysomelidae* (10 species)
 9. *Chrysomelidae* (10 species)
 10. *Chrysomelidae* (10 species)

$$f_i \leq 1, \quad 0 \leq c_1 \leq 1, \quad \tau f_i(t) \leq$$

$$-i^{1-t} \tau f_i(t) < c_2, \quad \forall t \in [0, 1], \quad \forall i \in \{1, \dots, N\}. \quad (2.10)$$

$$\leq c_1 \leq \dots \leq i \frac{N_i}{m} \leq \dots \leq i \frac{N_i}{m} \leq c_2 \leq \dots \leq c_1 \leq c_2,$$

$$N_i = m, \quad i = 1, \dots, n; \quad m_1 + \dots + m_n = m.$$

$n = 1, \dots, \{t_{ij} - t_{i,j-1} : j = 2, \dots, m\}, \dots$

$$(3) \quad n = O(m^{-1}), \dots, n, m$$

$X_{ij}, \dots, Z_{ij}, \dots$

$$(4) \quad \dots E[X_{ij}^4] < \dots E[Z_{ij}^4] < \dots$$

$\dots (1989).$

$\dots (f, g)(h) = \dots (f, g, h) \dots$

$\dots T_1, T_2, F = \dots T_1, T_2, T = \dots T_1, T_2, T = \dots$

$\dots G_V, \dots G_V, \dots$

$\dots \mathcal{I} = \{i : |\mathcal{I}_i| = 1\}, \dots |\mathcal{I}_i|, \dots \mathcal{I}_i = \{j : j = i\}$

$\dots \mathbf{P}_j^V = \sum_k \mathcal{I}_j \dots \mathbf{P}_j^V = \sum_k \mathcal{I}_j \dots$

$$y_j = \frac{1}{2} \{ |l - j| : l \in \mathcal{I}_j \}, \quad (1)$$

$\dots \Lambda^y = \{z \in \mathcal{C} : |z - j| = y_j\}, \dots \mathcal{C}$

$\mathbf{R}_V, \dots \mathbf{R}_V(z) = (\mathbf{G}_V - zI)^{-1}, \dots \mathbf{R}_V(z) = (\mathbf{G}_V - zI)^{-1}$

$$\Lambda^y = \{ \mathbf{R}_V(z) : z \in \Lambda^y \} \quad (2)$$

$M = M(n), \dots V(t), \dots$

$\hat{V}_i(t) = \hat{\mu}_V(t) + \sum_{m=1}^M \hat{v}_m(t) \quad (13)$

$\dots \mu_V, \dots$

$M = M(n), \dots n, m, \dots$

$$(5) \quad n = \sum_{j=1}^M (\dots) / (\dots) = 0, \dots M =$$

$$(6) \quad \sum_{j=1}^M \dots = o(\dots) \dots \sum_{j=1}^M \dots \times$$

$\dots (5), \dots (6), \dots$

$\dots b_S^2 + (\dots)^{-1}, \dots V, \dots$

$$(7) \quad E[\dots] = o(n), \dots V^{(M)}(t) =$$

$$(8) \quad \dots = o_p(1), \dots n =$$

$g(x; t), \dots X_{ij}, \dots g_2(x_1, x_2; t_1, t_2), \dots$

$\dots Z_{ij}, \dots (Z_{ij_1}, Z_{ij_2}), \dots$

$\dots g(\cdot; t), f(\cdot; t), t \in \mathcal{T}, \dots g_2(\cdot; t_1, t_2), f_2(\cdot; t_1, t_2), t_1, t_2 \in \mathcal{T}, \dots$

$$(1.1) \quad (d^2/dt^2)g(x; t) \dots (d^2/dt^2)f(z; t) \dots$$

$$(1.2) \quad (d^2/dt_1^1 dt_2^2)g_2(x_1, x_2; t_1, t_2) \dots (d^2/dt_1^1 dt_2^2)f_2(z_1, z_2; t_1, t_2) \dots$$

$$\dots \int e^{-iut} \dots \int e^{-i(ut+ivs)} \dots$$

$$(2.1) \quad \dots \int \dots \int \dots$$

$$(2.2) \quad \dots \int \dots \int \dots$$

APPENDIX C: PROOFS

$P, \dots n, 1$

$W, \dots S, V, \dots$

$\dots S, V, \dots R_j = R_j(-1)$

$\dots R_{ij}, (1), \dots j, \dots E(R_j) = 0, \dots E(R_j^2) < C_1$

$\dots C_1, \dots (1), \dots$

$\dots (1979), \dots$

$$E \left(\dots |\hat{S}(t) - S(t)| \right) = O \left(b_S^2 + \frac{1}{mb_S} \right) \quad (1)$$

$\dots |S^{(j)}(-1)|, \dots |V(-1)|, \dots$

$$E \left(\dots |\hat{S}(t) - S(t)| \right) = O \left(b_S^2 + \frac{1}{mb_S} \right), \quad (14)$$

$\dots \{t_{ij}, Z_{ij}\}, \dots$

$\dots \hat{\mu}_V, \hat{G}_V, \dots \hat{W}, \dots \hat{k}, \dots \hat{k}, \dots \hat{k}, \dots$

$\dots (2), \dots (3), \dots (4), \dots (5), \dots$

$$nk = \frac{V_k A_k}{nh_V^2 - A_k}, \dots nk = \frac{V_k A_k}{m^{-1} - A_k}, \quad (1)$$

$$m = b_S^2 + (\dots)^{-1}, \dots V_k, \dots A_k, \dots (1), \dots (2)$$

Lemma C.1. $\dots (2.1), (2.3), (3), (5), \dots (1.1), (2.2),$

$$\dots |\hat{\mu}_V(t) - \mu_V(t)| = O_p \left(\frac{1}{nb_V} \right), \dots$$

$$\dots |\hat{G}_V(s, t) - G_V(s, t)| = O_p \left(\frac{1}{nh_V^2} \right), \quad (2)$$

$$+ \frac{1}{t} \left\{ \sum_{k=1}^M \hat{v}_k(t) - \sum_{k=1}^M \hat{v}_k(t) \right\}$$

$$Q_{i1}(n) + Q_{i2}(n),$$

$$Q_{i1}(n)^p = O_p(1), \quad Q_{i2}(n)^p = O_p(1). \quad (5), \quad Q_{i2}(n)^p = O_p(1). \quad (7),$$

$$Q_{i2}(n) = O_p(1), \quad O_p(1) = O_p(1),$$

$$Q_{i1}(n) = \frac{1}{t} \left\{ \sum_{k=1}^M |\hat{v}_k(t) - \hat{v}_k(t)| \right. \\ \left. + \sum_{k=1}^M |\hat{v}_k(t) - \hat{v}_k(t)| \right\}. \quad (11)$$

$$(10), \quad (11)$$

$$C_1 \sum_{k=1}^M \hat{v}_k^2 + \frac{1}{n} \left\{ C_2 + \sum_{j=2}^m |Z_{ij}|(t_{ij} - t_{i,j-1}) \right\}^p = 0.$$

$$O_p\left\{\sum_{k=1}^M \hat{v}_k A_k E|\hat{v}_k|/(m^{-1} - A_k)\right\} = E\left\{\sum_{k=1}^M \hat{v}_k A_k E|\hat{v}_k|/(m^{-1} - A_k)\right\} \\ = \sum_{k=1}^M \hat{v}_k A_k \frac{1}{m^{-1} - A_k} = n, \quad (11) \\ Q_{i1}(n) = O_p(1), \quad O_p(1) = O_p(1), \\ (18) \quad \frac{1}{t} \sum_{k=1}^M |\hat{v}_k(t) - \hat{v}_k(t)| = O_p(1) + O_p(1),$$

[Received December 2004. Revised December 2005.]

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