Boletín de Matemáticas
Vol. XIV, Nos. 1,2,3, (1980) pags, 127 - 144

APUNTES SOBRE UNA RELACION ENTRE NUMEROS PRIMOS +

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Aunque inicialmente nos propusimos encontrar una fórmula de aproximación para números primos , el resultado final de este trabajo es una relación funcional implícita entre éstos .

Esta relación es de la forma :

$F(p_1,p_2,\ldots,p_{k-1},p_k) = 0$, donde

$p_k = f(p_1,p_2,\ldots,p_{k-1})$, p_k es el k-ésimo primo.

Se siguió una metodología de ajuste de curvas por el método de los mínimos cuadrados . El resultado final se logró mediante cinco ajustes sucesivos , cada uno mejor que el anterior .

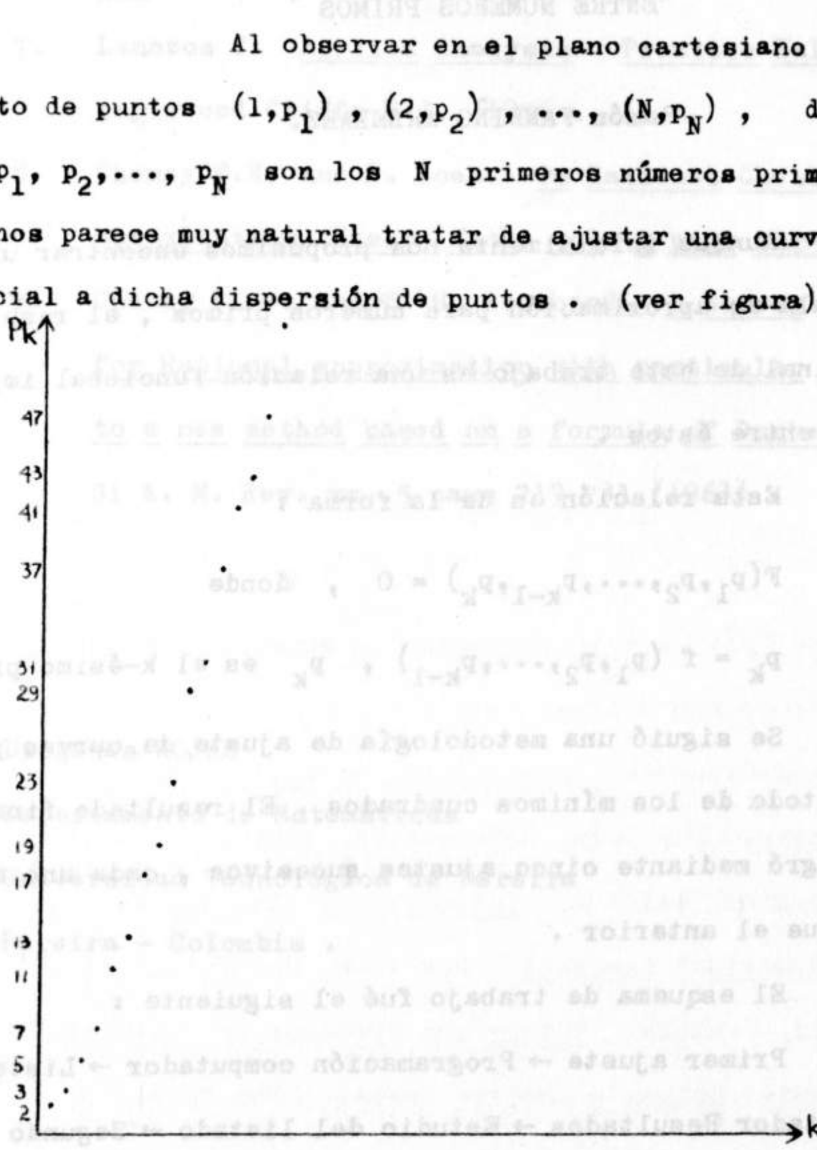
El esquema de trabajo fué el siguiente :

Primer ajuste → Programación computador → Listado computador Resultados → Estudio del listado → Segundo ajuste → Programación computador → Listado computador

Resultados → Estudio del listado → Tercer ajuste → ... → Quinto ajuste → Programación computador → Listado computador Resultados Finales → Conclusiones .

PRIMER AJUSTE

Al observar en el plano cartesiano el conjunto de puntos $(1,p_1)$, $(2,p_2)$, ..., (N,p_N) , donde $p_1, p_2, \ldots, p_N$ son los N primeros números primos dados , nos parece muy natural tratar de ajustar una curva exponencial a dicha dispersión de puntos . (ver figura) .



Sea el modelo exponencial : $y = ab^x$ donde

$x = 1, 2, \ldots, N$ y $y = p_1, p_2, \ldots, p_N$

Encontraremos los valores de los parámetros

a y b en términos de $p_1, p_2, \ldots, p_N$ y N .

Linealizando el modelo $y = ab^x$, tenemos :

$\log y = \log a + (\log b)\, x$ ó $\tilde{y} = \tilde{a} + \tilde{b}x$ con

$\tilde{y} = \log y$; $\tilde{a} = \log a$ y $\tilde{b} = \log b$.

Sea además : $\tilde{y}_x = \log y_x$ donde $x = 1,2,\ldots,N$

y $y_x = p_x = x$ - ésimo primo .

Sea : $F(\tilde{a},\tilde{b}) = \sum_{x=1}^{N} (\tilde{y}_x - \tilde{y})^2$

$$= \sum_{x=1}^{N} (\tilde{y}_x - \tilde{a} - \tilde{b}x)^2$$

Encontraremos aquellos valores de $\tilde{a}$ y $\tilde{b}$ que minimizan $F(\tilde{a}, \tilde{b})$

Para ésto :

$$\frac{\delta F}{\delta \tilde{a}} = -2 \sum_{x=1}^{N} (\tilde{y}_x - \tilde{a} - \tilde{b}x) = 0$$

y
$$\frac{\delta F}{\delta \tilde{b}} = -2 \sum_{x=1}^{N} (\tilde{y}_x - \tilde{a} - \tilde{b}x)x = 0$$

De donde se obtienen las ecuaciones normales :

$$N\tilde{a} + \left(\sum_{x=1}^{N} x\right)\tilde{b} = \sum_{x=1}^{N} \tilde{y}_x$$

$$y \quad \left(\sum_{x=1}^{N} x\right)\tilde{a} + \left(\sum_{x=1}^{N} x^2\right)\tilde{b} = \sum_{x=1}^{N} \tilde{y}_x x$$

Resolviendo para $\tilde{a}$ y $\tilde{b}$, obtenemos :

$$\bar{\tilde{a}} = \frac{\sum_{x=1}^{N} x^2 \sum_{x=1}^{N} \tilde{y}_x - \sum_{x=1}^{N} x \sum_{x=1}^{N} \tilde{y}_x x}{N \sum_{x=1}^{N} x^2 - \left(\sum_{x=1}^{N} x\right)^2} \qquad (1)$$

$$y \quad \bar{\tilde{b}} = \frac{N \sum_{x=1}^{N} \tilde{y}_x x - \sum_{x=1}^{N} x \sum_{x=1}^{N} \tilde{y}_x}{N \sum_{x=1}^{N} x^2 - \left(\sum_{x=1}^{N} x\right)^2} \qquad (2)$$

Recordando que :

$$\sum_{x=1}^{N} x^2 = \frac{N^3}{3} + \frac{N^2}{2} + \frac{N}{6}$$

$$\sum_{x=1}^{N} x = \frac{N(N+1)}{2}$$

$$\sum_{x=1}^{N} \tilde{y}_x = \sum_{x=1}^{N} \log y_x = \log(y_1 y_2 \ldots y_N)$$

$$y \sum_{x=1}^{N} \tilde{y}_x x = \sum_{x=1}^{N} (\log y_x)x = \sum_{x=1}^{N} \log y_x^x = \log(y_1^1 y_2^2 \dots y_N^N)$$

y reemplazando en las expresiones (1) y (2) tenemos :

$$\bar{a}^{\sim} = \log \frac{(y_1\ y_2\ \dots\ y_N)^A}{(y_1^1\ y_2^2\ \dots\ y_N^N)^B}$$

$$\bar{b}^{\sim} = \log \frac{(y_1^1\ y_2^2\ \dots\ y_N^N)^C}{(y_1\ y_2\ \dots\ y_N)^B}$$

donde

$$A = \frac{4N^2 + 6N + 2}{N^3 - N} \quad , \quad B = \frac{6N + 6}{N^3 - N} \quad , \quad C = \frac{12}{N^3 - N}$$

Como $\tilde{a} = \log a$ y $\tilde{b} = \log b$, entonces :

$$\bar{a} = \frac{(y_1\ y_2\ \dots\ y_N)^A}{(y_1^1\ y_2^2\ \dots\ y_N^N)^B} \tag{3}$$

y
$$\bar{b} = \frac{(y_1^1\ y_2^2\ \dots\ y_N^N)^C}{(y_1\ y_2\ \dots\ y_N)^B} \tag{4}$$

Reemplazando (3) y (4) en la función

$y = a\, b^x$, obtenemos :

$$\bar{y}_x = \left(\frac{(y_1\, y_2 \cdots y_N)^A}{(y_1^1\, y_2^2 \cdots y_N^N)^B} \right) \times \left(\frac{(y_1^1\, y_2^2 \cdots y_N^N)^C}{(y_1\, y_2 \cdots y_N)^B} \right)^x ;$$

para $x = 1,2,3,\ldots,$ y N fijo .

Esta fórmula es la exponencial ajustada a los N primeros números primos $y_1, y_2, \cdots, y_N$ dados y nos permite calcular valores aproximados $\bar{y}_x$ de los primos p_x para cada $x = 1,2,3,\ldots$

Si ahora escribimos :

k en lugar de x ; ${}_1p_k$ en lugar de $\bar{y}_x$ y p_k en lugar de y_x , obtenemos :

$$ {}_1p_k = \left(\frac{(p_1\, p_2 \cdots p_N)^A}{(p_1^1\, p_2^2 \cdots p_N^N)^B} \right) \times \left(\frac{(p_1^1\, p_2^2 \cdots p_N^N)^C}{(p_1\, p_2 \cdots p_N)^B} \right)^k ; \quad (5)$$

para $k = 1,2,3,\ldots$ y N fijo .

Aquí ${}_1p_k$ es un valor "aproximado" de p_k para cada $k = 1,2,3,\ldots$

Para evitar una extrapolación inadecuada y peligrosa cuando $k > N$, tomamos en nuestra fórmula (5)

$N = k - 1$ y obtenemos, después de hacer las respectivas simplificaciones y reducciones :

$$ {}_1p_k = \prod_{i=1}^{k-1} p_i^{\frac{6i-2k-2}{k^2-3k+2}} \quad ; \text{ para } k = 3,4,5,\ldots \qquad (6) $$

En (6) tenemos una familia de curvas exponenciales de ajuste ya que cada ${}_1p_k$ (para $k = 3,4,5,\ldots$) viene dado en función de $p_1, p_2, \ldots, p_{k-1}$.

La fórmula (6) se programó en el computador del centro de cómputo de la Universidad Nacional (computador digital IBM 360/44) y se obtuvo el listado de las columnas 1, 2 y 3 .

Después de un estudio detenido de dicho listado se llegó a la conclusión de que las diferencias

${}_1\delta({}_1p_k) = p_k - {}_1p_k$ (D. 1er a.) presentan una tendencia lineal y por consiguiente se procedió a un ajuste lineal de dichas diferencias , pues en definitiva el ajuste que se obtuvo en (6) no es bueno como se comprueba con el listado .

SEGUNDO AJUSTE

Sea el modelo lineal : $z = c + dx$ donde

$x = 1,2,\ldots, N$ y $z = \delta({}_1p_1), \delta({}_1p_2),\ldots, \delta({}_1p_N)$.

Encontraremos los valores de los parámetros c y d en términos de $\delta({}_1p_1), \delta({}_1p_2),\ldots, \delta({}_1p_N)$

Sea además $z_x = \delta({}_1p_x) = x$ - ésima diferencia ; $x = 1,2,\ldots, N$.

Si $G(c,d) = \sum_{x=1}^{N} (z_x - z)^2 = \sum_{x=1}^{N} (z_x - c - dx)^2$,

encontraremos aquellos valores de c y d que minimizan $G(c,d)$.

Por el método de los mínimos cuadrados , obtenemos

$$\bar{c} = \frac{\sum_{x=1}^{N} x^2 \sum_{x=1}^{N} z_x - \sum_{x=1}^{N} x \sum_{x=1}^{N} z_x x .}{N \sum_{x=1}^{N} x^2 - \left(\sum_{x=1}^{N} x\right)^2}$$

y $$\bar{d} = \frac{N \sum_{x=1}^{N} z_x x - \sum_{x=1}^{N} x \sum_{x=1}^{N} z_x}{N \sum_{x=1}^{N} x^2 - \left(\sum_{x=1}^{N} x\right)^2}$$

Haciendo los cambios y reemplazos respectivos , obtenemos :

$$ {}_1\delta({}_1p_k) = \sum_{i=1}^{k-1} \frac{6i-2k-2}{k^2-3k+2}\, \delta({}_1p_i)\, I_Q(i) \;;\; k=3,4,5,\ldots \qquad (7) $$

donde I es la función indicadora y

$$ Q = \left\{ 3,4,5,\ldots \right\} $$

Aquí ${}_1\delta({}_1p_k)$ es un valor "aproximado" de $\delta({}_1p_k)$ para cada $k = 3,4,5,\ldots$

En (7) tenemos una familia de rectas de ajuste ya que cada ${}_1\delta({}_1p_k)$ viene dada en función de $\delta({}_1p_1)$, $\delta({}_1p_2)$, ... , $\delta({}_1p_{k-1})$ para $k = 3,4,5,\ldots$

Recordando que $p_k = {}_1p_k + \delta({}_1p_k)$ para $k = 3,4,5,\ldots$ y que ${}_1\delta({}_1p_k) \cong \delta({}_1p_k)$ obtenemos el modelo reajustado :

$$ {}_2p_k = {}_1p_k + {}_1\delta({}_1p_k) \;;\; k = 3,4,5,\ldots, \qquad (8) $$

Esta fórmula se programó y se obtuvo el listado de las columnas 4 y 5 .

Se observa que el ajuste ${}_2p_k$ es mucho mejor que el ajuste ${}_1p_k$ y las diferencias

$\delta({}_2p_k) = p_k - {}_2p_k$ (D. 2$^{\underline{o}}$ a.) presentan tendencia lineal .

Aún así el ajuste ${}_2p_k$ no nos pareció satisfactorio y por consiguiente se procedió a un ajuste lineal de las diferencias $\delta({}_2p_k)$.

TERCER AJUSTE

Sea el modelo lineal : $w = e + f\,x$

donde $x = 1,2,\ldots, N$ y $w = \delta({}_2p_1)$, $\delta({}_2p_2),\ldots, \delta({}_2p_N)$.

Encontraremos los valores de los parámetros e y f en términos de $\delta({}_2p_1), \delta({}_2p_2),\ldots, \delta({}_2p_N)$ y N

Sean además $w_x = \delta({}_2p_x)$ = x-ésima diferencia ; $x = 1,2,\ldots, N$;

$$H(e,f) = \sum_{x=1}^{N} (w_x - w)^2 = \sum_{x=1}^{N} (w_x - e - fx)^2 .$$

Encontraremos aquellos valores de e y f que minimizan H(e,f) haciendo un desarrollo idéntico al que se hizo para los dos primeros ajustes . De esta manera se obtiene :

$$_1\delta({}_2p_k) = \sum_{i=1}^{k-1} \frac{6i-2k-2}{k^2-3k+2}\, \delta({}_2p_i) \cdot I_Q(i) \;;\; k = 3,4,5,\ldots \tag{9}$$

Donde $_1\delta({}_2p_k)$ es un valor "aproximado" de $\delta({}_2p_k)$ para cada $k = 3,4,5,\ldots$

Recordando que $p_k = {}_2p_k + \delta({}_2p_k)$ para $k = 3,4,5,\ldots$

y que $_1\delta({}_2p_k) \simeq \delta({}_2p_k)$ obtenemos el modelo reajustado :

$$ {}_3p_k = {}_2p_k + {}_1\delta({}_2p_k) \; ; \quad k = 3,4,5,\ldots \tag{10} $$

Esta fórmula se programó y se obtuvo el listado de las columnas 6 y 7 .

Se observa que el ajuste ${}_3p_k$ es aún mejor que el ajuste ${}_2p_k$ y las diferencias $\delta({}_3p_k) = p_k - {}_3p_k$ (D. 3^er a.) no presentan ninguna tendencia específica , pues oscilan alrededor de cero en forma aparentemente errática . (Vale decir que la gráfica de $(k, \delta({}_3p_k))$ se parece mucho a un electrocardiograma) .

Como el ajuste ${}_3p_k$ no nos pareció aún satisfactorio procedimos a un nuevo ajuste .

CUARTO AJUSTE

Este ajuste no se hizo por mínimos cuadrados sino que se trabajó con las diferencias relativas

$\dfrac{\delta({}_3p_k)}{p_k}$ así :

Para cada $k = 3,4,5,\ldots,$ tenemos :

$$ \frac{p_k - {}_3p_k}{p_k} = \frac{\delta({}_3p_k)}{p_k} \Longrightarrow p_k - {}_3p_k = p_k \frac{\delta({}_3p_k)}{p_k} $$

$$\Rightarrow p_k - p_k \frac{\delta({}_3p_k)}{p_k} = {}_3p_k \Rightarrow p_k \left(1 - \frac{\delta({}_3p_k)}{p_k}\right) = {}_3p_k$$

$\Rightarrow p_k \left(1 - \dfrac{\delta({}_3p_{k-1})}{p_{k-1}}\right) \simeq {}_3p_k$ ya que $\dfrac{\delta({}_3p_{k-1})}{p_{k-1}}$ es practicamente igual a $\dfrac{\delta({}_3p_k)}{p_k}$. Luego,

$$p_k \simeq \frac{1}{1 - \dfrac{\delta({}_3p_{k-1})}{p_{k-1}}}\ {}_3p_k$$

$$\Rightarrow p_k \simeq \frac{p_{k-1}}{p_{k-1} - p_{k-1} + {}_3p_{k-1}}\ {}_3p_k$$

$$\Rightarrow p_k \simeq \frac{p_{k-1}}{{}_3p_{k-1}}\ {}_3p_k .$$

Sea $\quad {}_4p_k = \dfrac{p_{k-1}}{{}_3p_{k-1}}\ {}_3p_k \quad$ para $\quad k = 3,4,5,\ldots \qquad (11)$

Esta fórmula se programó y se obtuvo el listado de las columnas 8 y 9 .

Se observa que el ajuste ${}_4p_k$ es mucho mejor que el ajuste ${}_3p_k$ y las diferencias $\delta({}_4p_k) = p_k - {}_4p_k$ (D. 4º a.) no presentan ninguna tendencia específica , pues oscilan alrededor de cero en forma aparentemente errática , aunque la amplitud máxima de oscilación es más pequeña que la correspondiente del 3^{er} ajuste .

Teniendo en cuenta que aunque el $4^{\underline{o}}$ ajuste es relativamente bueno pero no nos satisfizo plenamente , nos pusimos a ensayar relaciones entre los elementos del listado de las columnas 1 a 9 , claro está con calculadora en mano.

Después de múltiples operaciones (para 100 valores de k escogidos al azar dentro del listado de k = 3 a 4999) se conjeturó el siguiente resultado :

QUINTO AJUSTE

$${}_5p_k = {}_4p_k - (\delta({}_3p_{k-1}) - \delta({}_3p_k)) \tilde{=} p_k \quad \text{para}$$

k = 4,5,... (12)

Se programó la fórmula (12) y se obtuvo el listado de las columnas 10 y 11 .

Como se puede ver , los resultados obtenidos son plenamente satisfactorios , pues ${}_5p_k$ es prácticamente igual a p_k para k = 4,5,..., 4999 . y $\delta({}_5p_k)=p_k-{}_5p_k$ es casi cero para k = 4,5,..., 4999 (salvo para k = 4,6,11) .

De la relación (12) y de las columnas 10 y 11 del listado se puede concluir :

p_k = entero más próximo a $_5p_k$ para $k = 4,5,\ldots,$ 4999 . (salvo para $k = 4,6,11$) . (13)

A partir del resultado (13) llegamos a nuestra " Relación funcional implícita entre números primos " .

Como $p_k \simeq \frac{p_{k-1}}{_3p_{k-1}}\,{_3p_k} - (\,\delta(_3p_{k-1}) - \delta(_3p_k))$ para

$k = 4,5,\ldots,$ 4999 ,

entonces $p_k \simeq \frac{p_{k-1}}{_3p_{k-1}}\,{_3p_k} - p_{k-1} + {_3p_{k-1}} + p_k - {_3p_k}$

para $k = 4,5,\ldots,$ 4999 .

Luego : $\frac{p_{k-1}}{_3p_{k-1}}\,{_3p_k} - p_{k-1} + {_3p_{k-1}} - {_3p_k} \simeq 0$

para $k = 4,5,\ldots,$ 4999 .

O lo que es lo mismo :

$\frac{p_k}{_3p_k}\,{_3p_{k+1}} - p_k + {_3p_k} - {_3p_{k+1}} \simeq 0$ para $k=4,5,\ldots,$ 4999

y en definitiva

$$\psi\left(\frac{p_k}{_3p_k}\,{_3p_{k+1}} - p_k + {_3p_k} - {_3p_{k+1}}\right) = 0$$

para $k = 4,5,\ldots,$ 4999 (salvo para $k = 4,6,11$) .

donde ψ es la función " entero más próximo a " .

O sea :

$$\psi\,(h(p_1,\, p_2,\ldots,\, p_{k-1},\, p_k)) = 0\ .$$

para $k = 4,5,\ldots, 4999$. (salvo para $k = 4,6,11$) .

Aquí el k-ésimo primo es función implícita de los $k-1$ primos anteriores $p_1,\, p_2,\ldots,\, p_{k-1}$.

Por consiguiente nuestro resultado final es :

Una relación funcional implícita entre números primos .

Que esta relación sea válida o nó para $k > 4999$ es algo que habría que demostrarse o por lo menos verificarse .

RESUMEN DE LAS RELACIONES OBTENIDAS

$$\begin{cases} {}_1p_k = \prod_{i=1}^{k-1} p_i^{\frac{6i-2k-2}{k^2-3k+2}}\ ; \quad k = 3,4,5\ . \quad (1^{er}\ \text{ajuste}) \\ \delta({}_1p_k) = p_k - {}_1p_k\ . \end{cases}$$

$$\begin{cases} {}_2p_k = {}_1p_k + \sum_{i=1}^{k-1} \frac{6i-2k-2}{k^2-3k+2}\ \delta({}_1p_i)\ \ I_Q(i) \\ \quad k = 3,4,5,\ldots \qquad\qquad (2^o\ \text{ajuste}) \end{cases}$$

$$\begin{cases} \delta({}_2p_k) = p_k - {}_2p_k \, . \\[2ex] {}_3p_k = {}_1p_k + \sum_{i=1}^{k-1} \frac{6i-2k-2}{k^2-3k+2} \left(\delta({}_1p_i) + \delta({}_2p_i) \right) I_Q(i) \\[1ex] \qquad k = 3,4,5,\ldots \qquad\qquad\qquad\qquad (\, 3^{er} \text{ ajuste}) \\[2ex] \delta({}_3p_k) = p_k - {}_3p_k \, . \end{cases}$$

$$\begin{cases} {}_4p_k = \dfrac{p_{k-1}}{{}_3p_{k-1}} \, {}_3p_k \, , \quad k = 4,5,\ldots \qquad\qquad (\, 4^{o} \text{ ajuste}) \\[2ex] \delta({}_4p_k) = p_k - {}_4p_k \, . \end{cases}$$

$$\begin{cases} {}_5p_k = {}_4p_k - (\, \delta({}_3p_{k-1}) - \delta({}_3p_k)) \, ; \; k=4,5,\ldots \; (5^{o} \text{ ajuste}) \\[2ex] \delta({}_5p_k) = p_k - {}_5p_k \, . \end{cases}$$

RESULTADO FINAL

$\delta({}_5p_k) \simeq 0$ para $k = 4,5,\ldots, \; 4999$ (salvo para $k=4,6,11$)

Mejor : $\psi\, (\, \delta({}_5p_k)) = 0$.

(donde ψ es la función " entero más próximo a " .

Nota :

Como se desprende de lo expuesto , este trabajo , aunque tiene que ver con la distribución de los números primos y por consiguiente con la Teoría de Números , no utiliza ningún resultado de ésta , por lo tanto no presentamos ninguna bibliografía .

Las técnicas utilizadas por el autor (ajuste de curvas - números cuadrados) son ampliamente conocidas .

+Este trabajo fué presentado en octubre de 1979 por Ramón Fandiño Arbeláez , para su promoción a profesor Asistente.

Nota :

El trabajo de programación fué realizado con la mayor diligencia por los Drs. Gloria Inés Giraldo y Jaime Herrera Bernal del Centro de Cómputo de la Universidad Nacional por lo cual el autor les queda altamente agradecido .

ANEXO 1 : PROGRAMA DE COMPUTADOR

ANEXO 2 : DIAGRAMA DE FLUJO

ANEXO 3 : PARTE DEL LISTADO .

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```
      DIMENSION P(100),S1(100),S2(100),S3(100)
      P(1)=2.
      P(2)=3.
      P(3)=5.
      P(4)=7.
      S1(1)=0.
      S1(2)=0.
      S[illegible](1)=0.
      S2([illegible])=0.
      S3(1)=0.
      S3(2)=0.
      NL=0
      [illegible]
      DO 20 I=11,500,2
      K=SQRT(FLOAT(I))
      DO 10 J=3,K,2
      IF(MOD(I,J) .EQ. 0) GO TO 20
   10 CONTINUE
      N=N+1
      P(N)=I
   20 CONTINUF
   25 DO 30 K=3,N
      S1(K)=1.
      VI=K*K-3*K+2
      L=K-1
      DO 30 M=1,L
      VS=6*M-2*K-2
      POT=VS/VI
      IF(POT) 28,26,27
   26 AUX=1.
      GO TO 29
   27 AUX=P(M)**POT
      GO TO 29
   28 POT=-1.0*POT
      AUX=1.0/(P(M)**POT)
   29 S1(K)=S1(K)*AUX
   30 CONTINUE
      DO 50 K=3,N
      S2(K)=0.
      VI=K*K-3*K+2
      L=K-1
      DO 40 M=1,L
      IF(M .LT. 3)GO TO 40
      VS=6*M-2*K-2
      AUX=(P(M)-S1(M))*(VS/VI)
      S2(K)=S2(K)+AUX
   40 CONTINUE
      S2(K)=S2(K)+S1(K)
   50 CONTINUE
      DO 80 K=3,N
      S3(K)=0.
      VI=K*K-3*K+2
      L=K-1
      DO 70 M=1,L
      IF(M .LT. 3) GO TO 70
      VS=6*M-2*K-2
      AUX=(2*P(M)-S1(M)-S2(M))*(VS/VI)
      S3(K)=S3(K)+AUX
```

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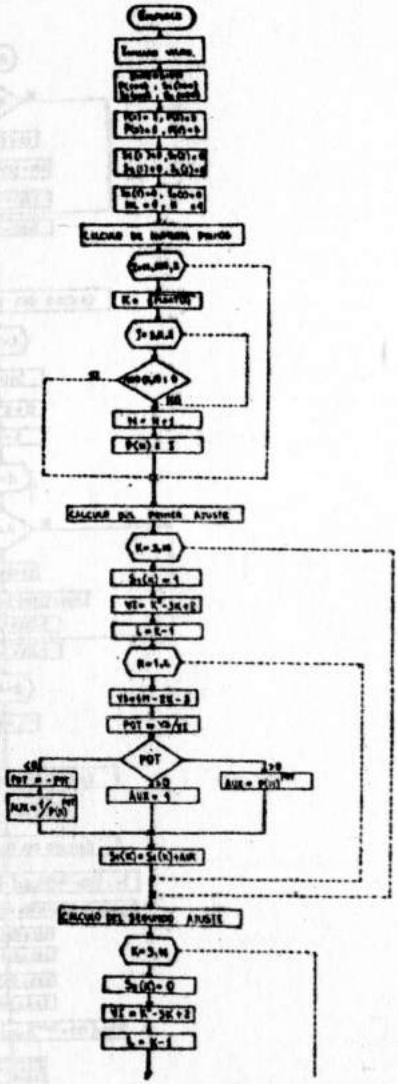
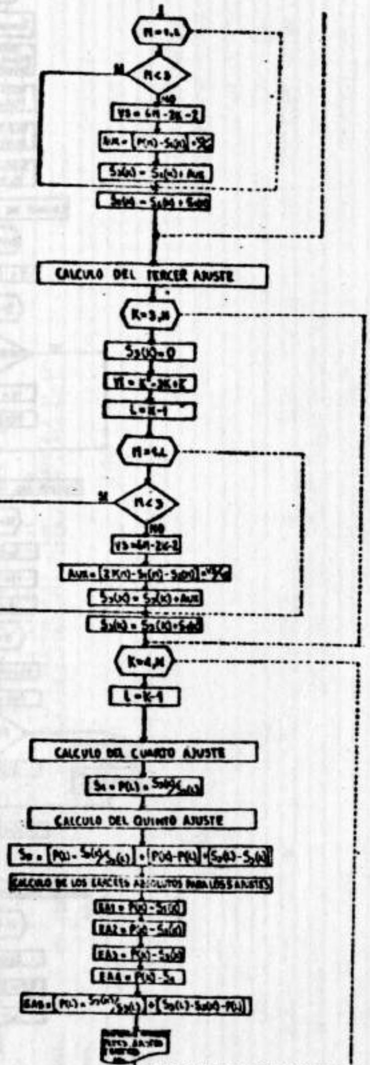
```
0059        70 CONTINUE
0060           S3(K)=S3(K)+S1(K)
0061        80 CONTINUE
0062           WRITE(6,100)
0063           DO 90 K=4,N
0064           L=K-1
0065           S4=P(L)/S3(L)*S3(K)
0066           T=P(L)/S3(L)*S3(K)-P(L)*S3(L)-S3(K)
0067           Q=T*P(K)
0068           E1=P(K)-S1(K)
0069           E2=P(K)-S2(K)
0070           E3=P(K)-S3(K)
0071           E4=P(K)-S4
0072           NP=P(K)
0073           NL = NL + 1
0074           IF(NL .GT. 53) GO TO 85
0075           WRITE(6,200) NP,S1(K),E1,S2(K),E2,S3(K),E3,S4,E4,Q,T
0076           GO TO 90
0077        85 WRITE(6,100)
0078           WRITE(6,200) NP,S1(K),E1,S2(K),E2,S3(K),E3,S4,E4,Q,T
0079           NL = 1
0080        90 CONTINUE
0081       100 FORMAT('1' , 20X , 'N U M E R O S  P R I M O S   -   A J U S T E',
              1        ' S   -   D I F E R E N C I A S  A B S O L U T A S' /
              2        50X ,  '(PARA  K = 4, 5, 6, . . . , 4999)'  //
              3        124X , 'R. F. I.' /
              4        1X ,  'PRIMO   AJUSTE # 1   DIFERENCIAS   AJUSTE # 2 ' ,
              5        'DIFERENCIAS   AJUSTE # 3 DIFERENCIAS   AJUSTE # 4 ' ,
              6        'DIFERENCIAS   AJUSTE # 5 DIFERENCIAS' /
              7        22X , 'AJUSTE # 1' , 15X , 'AJUSTE # 2' , 15X ,
              8        'AJUSTE # 3' , 15X , 'AJUSTE # 4' , 15X , 'AJUSTE # 5' //)
0082       200 FORMAT(1X,I5,F13.6,F14.6,F13.6,F12.6,F13.6,F12.6,F13.6,F12.6,
              1        F13.6,F12.6)
0083           STOP
0084           END
```

146

146


CALCULO DEL PRIMER AJUSTE
POT
AUX = 1
L = K-1
CALCULO DEL SEGUNDO AJUSTE
L = K-1


CALCULO DEL TERCER AJUSTE
CALCULO DEL CUARTO AJUSTE
CALCULO DEL QUINTO AJUSTE

NUMEROS PRIMOS - AJUSTES - DIFERENCIAS ABSOLUTAS

(PARA K = 4, 5, 6, . . . , 4999)

PRIMO	AJUSTE # 1	DIFERENCIAS AJUSTE # 1	AJUSTE # 2	DIFERENCIAS AJUSTE # 2	AJUSTE # 3	DIFERENCIAS AJUSTE # 3	AJUSTE # 4	DIFERENCIAS AJUSTE # 4	R. F. I. AJUSTE # 5	DIFERENCIAS AJUSTE # 5
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
7	7.768066	-0.768066	8.434739	-1.434739	9.101416	-2.101416	10.112697	-3.112697	7.511274	0.511274
11	11.067963	-0.067963	10.549898	0.450102	9.365164	1.634836	7.202851	3.797149	10.939103	-0.060897
13	16.878418	-3.878418	16.540009	-3.540009	16.282715	-3.282715	19.125107	-6.125107	14.207550	1.207550
17	21.707428	-4.707428	18.918610	-1.918610	16.419388	0.580612	13.109118	3.890882	16.972443	-0.027557
19	27.836670	-8.836670	23.355362	-4.355362	20.665512	-1.665512	21.396271	-2.396271	19.150146	0.150146
23	33.035599	-10.035599	25.574936	-2.574936	21.592102	1.407898	19.851898	3.148102	22.925308	-0.074692
29	39.135071	-10.135071	29.365341	-0.365341	25.409256	3.590744	27.066025	1.933975	29.248871	0.248871
31	47.150925	-16.150925	35.898758	-4.898758	32.873825	-1.873825	37.519394	-6.519394	32.054825	1.054825
37	54.094406	-17.094406	39.704651	-2.704651	35.689072	1.310928	33.654770	3.345230	36.839523	-0.160477
41	62.485703	-21.485703	45.615509	-4.615509	41.642441	-0.642441	43.172028	-2.172028	41.218658	0.218658
43	70.915619	-27.915619	50.942368	-7.942368	46.427582	-3.427582	45.711304	-2.711304	42.926163	-0.073837
47	78.324814	-31.324814	54.247238	-7.247238	48.387924	-1.387924	44.815613	2.184387	46.855270	-0.144730
53	85.857758	-32.857758	57.785599	-4.785599	51.093033	1.906967	49.627502	3.372498	52.922394	-0.077606
59	94.381363	-35.381363	62.869614	-3.869614	56.155960	2.844040	58.251862	0.748138	59.188934	0.188934
61	103.690430	-42.690430	68.919449	-7.919449	62.419205	-1.419205	65.580414	-4.580414	61.317169	0.317169
67	112.046341	-45.046341	73.090851	-6.090851	65.875229	1.124771	64.377441	2.622559	66.921417	-0.078583
71	121.115433	-50.115433	78.314133	-7.314133	70.910370	0.089630	72.121063	-1.121063	71.085922	0.085922
73	130.047791	-57.047791	83.123947	-10.123947	75.330994	-2.330994	75.426178	-2.426178	73.005554	0.005554
79	138.138260	-59.138260	86.521820	-7.521820	77.878998	1.121002	75.469147	3.530853	78.921143	-0.078857
83	146.861969	-63.861969	90.982239	-7.982239	82.107086	0.892914	83.288910	-0.288910	83.060822	0.060822
89	155.472061	-66.472061	95.219254	-6.219254	86.076523	2.923477	87.012573	1.987427	89.043137	0.043137
97	164.597992	-67.597992	100.237015	-3.237015	91.168396	5.831604	94.264755	2.735245	97.172882	0.172882
101	174.746231	-73.746231	106.733475	-5.733475	98.214035	2.785965	104.496277	-3.496277	101.450638	0.450638
103	184.665848	-81.665848	112.607315	-9.607315	104.186386	-1.186386	107.141739	-4.141739	103.169388	0.169388
107	193.818939	-86.818939	117.124405	-10.124405	108.221451	-1.221451	106.989105	0.010895	106.954041	-0.045959
109	202.813538	-93.813538	121.383713	-12.383713	111.990555	-2.990555	110.726547	-1.726547	108.957443	-0.042557
113	211.132187	-98.132187	124.630478	-11.630478	114.500153	-1.500153	111.442566	1.557434	112.932968	-0.067032
127	219.356995	-92.356995	127.855377	-0.855377	117.179703	9.820297	115.644440	11.355560	126.964890	-0.035110
131	229.915375	-98.915375	134.779175	-3.779175	125.015671	5.984329	135.492615	-4.492615	131.656647	0.656647
137	240.235550	-103.235550	141.097595	-4.097595	131.786469	5.213531	138.094788	-1.094788	137.323990	0.323990
139	250.779297	-111.779297	147.593811	-8.593811	138.653015	0.346985	144.138168	-5.138168	139.271622	0.271622
149	260.647705	-111.647705	152.878418	-3.878418	143.744705	5.255295	144.104416	4.895584	149.012726	0.012726
151	271.593994	-120.593994	159.765320	-8.765320	151.000275	-0.000275	156.520706	-5.520706	151.265137	0.265137
157	281.876709	-124.876709	165.439560	-8.439560	156.467499	0.532501	156.467209	0.532791	156.999985	-0.000015
163	292.345703	-129.345703	171.322159	-8.322159	162.200714	0.799286	162.752625	0.247375	163.019409	0.019409
167	302.986572	-135.986572	177.376938	-10.376938	168.134949	-1.134949	168.963455	-1.963455	167.029221	0.029221
173	313.398438	-140.398438	182.980728	-9.980728	173.420929	-0.420929	172.250290	0.749710	172.964310	-0.035690
179	323.967041	-144.967041	188.767639	-9.767639	178.959854	0.040146	178.525467	0.474533	178.986542	-0.013458
181	334.679932	-153.679932	194.707367	-13.707367	184.696213	-3.696213	184.737595	-3.737595	181.001236	0.001236
191	344.805176	-153.805176	199.672989	-8.672989	189.102524	1.897476	185.318115	5.681885	190.911804	-0.088196
193	355.789307	-162.789307	205.950562	-12.950562	195.337204	-2.337204	197.297134	-4.297134	193.062454	0.062454
197	366.194336	-169.194336	211.251053	-14.251053	200.211670	-3.211670	197.816132	-0.816132	196.941666	-0.058334
199	376.393311	-177.393311	216.216736	-17.216736	204.671402	-5.671402	201.388184	-2.388184	198.928452	-0.071548
211	386.061768	-175.061768	220.380280	-9.380280	208.111832	2.888168	202.345078	8.654922	210.904648	-0.095352
223	396.863770	-173.863770	226.328415	-3.328415	214.060135	8.939865	217.030823	5.969177	223.082520	0.082520
227	408.690430	-181.690430	233.797165	-6.797165	222.035980	4.964020	231.308929	-4.308929	227.333084	0.333084
229	420.269043	-191.269043	240.731873	-11.731873	229.160797	-0.160797	234.283920	-5.283920	229.159103	0.159103
233	431.303711	-198.303711	246.722351	-13.722351	234.935425	-1.935425	234.770554	-1.770554	232.995926	-0.004074
239	442.121338	-203.121338	252.330414	-13.330414	240.108370	-1.108370	238.209656	0.790344	238.956711	-0.043289
241	453.021729	-212.021729	258.041016	-17.041016	245.599869	-4.599869	244.384720	-3.384720	240.973221	-0.026779
251	463.423096	-212.423096	262.962891	-11.962891	249.964371	1.035629	245.282745	5.717255	250.918243	-0.081757
257	474.486572	-217.486572	268.911133	-11.911133	255.769394	1.230606	256.828857	0.171143	257.023834	0.023834

NUMEROS PRIMOS - AJUSTES - DIFERENCIAS ABSOLUTAS
(PARA K = 4, 5, 6, . . . , 4999)

PRIMO	AJUSTE # 1	DIFERENCIAS AJUSTE # 1	AJUSTE # 2	DIFERENCIAS AJUSTE # 2	AJUSTE # 3	DIFERENCIAS AJUSTE # 3	AJUSTE # 4	DIFERENCIAS AJUSTE # 4	AJUSTE # 5	R. F. I. DIFERENCIAS AJUSTE # 5
18713	33795.937500	-15082.937500	18916.699219	-203.699219	18682.699219	30.300781	18711.187500	1.812500	18713.003906	0.003906
18719	33812.902344	-15093.902344	18926.058594	-207.058594	18691.984375	27.015625	18722.285156	-3.285156	18719.000000	0.0
18731	33831.273438	-15100.273438	18936.789063	-205.789063	18702.742188	28.257813	18729.761719	1.238281	18731.003906	0.003906
18743	33848.484375	-15105.484375	18946.390625	-203.390625	18712.296875	30.703125	18740.562500	2.437500	18743.007813	0.007813
18749	33865.824219	-15116.824219	18956.187500	-207.187500	18721.984375	27.015625	18752.691406	-3.691406	18749.003906	0.003906
18757	33884.136719	-15127.136719	18966.929688	-209.929688	18732.667969	24.332031	18759.695313	-2.695313	18757.011719	0.011719
18773	33901.539063	-15128.539063	18976.699219	-203.699219	18742.421875	30.578125	18766.765625	6.234375	18773.011719	0.011719
18787	33918.242188	-15131.242188	18985.812500	-198.812500	18751.496094	35.503906	18782.074219	4.925781	18787.000000	0.0
18793	33936.964844	-15143.964844	18996.964844	-203.964844	18762.578125	30.421875	18798.093750	-5.093750	18793.011719	0.011719
18797	33953.824219	-15156.824219	19006.277344	-209.277344	18771.820313	25.179688	18802.253906	-5.253906	18797.011719	0.011719
18803	33970.796875	-15167.796875	19015.648438	-212.648438	18781.125000	21.875000	18806.304688	-3.304688	18803.000000	0.0
18839	33989.687500	-15150.687500	19026.890625	-187.890625	18792.406250	46.593750	18814.285156	24.714844	18839.003906	0.003906
18859	34007.156250	-15148.156250	19036.843750	-177.843750	18802.242188	56.757813	18848.843750	10.156250	18859.007813	0.007813
18869	34024.445313	-15155.445313	19046.656250	-177.656250	18811.984375	57.015625	18868.765625	0.234375	18869.023438	0.023438
18899	34042.070313	-15143.070313	19056.648438	-157.648438	18822.148438	76.851563	18879.191406	19.808594	18899.027344	0.027344
18911	34060.386719	-15149.386719	19067.480469	-156.480469	18832.937500	78.062500	18909.824219	1.175781	18911.035156	0.035156
18913	34077.617188	-15164.617188	19077.210938	-164.210938	18842.730469	70.269531	18920.824219	-7.824219	18913.031250	0.031250
18917	34094.871094	-15177.871094	19086.929688	-169.929688	18852.449219	64.550781	18922.746094	-5.746094	18917.027344	0.027344
18919	34114.007813	-15195.007813	19098.546875	-179.546875	18864.152344	54.847656	18928.734375	-9.734375	18919.031250	0.031250
18947	34132.031250	-15185.031250	19109.078125	-162.078125	18874.562500	72.437500	18929.425781	17.574219	18947.015625	0.015625
18959	34147.824219	-15188.824219	19117.312500	-158.312500	18882.855469	76.144531	18955.316406	3.683594	18959.023438	0.023438
18973	34166.640625	-15193.640625	19128.671875	-155.671875	18894.218750	78.781250	18970.402344	2.597656	18973.039063	0.039063
18979	34183.828125	-15204.828125	19138.367188	-159.367188	18903.968750	75.031250	18982.785156	-3.785156	18979.035156	0.035156
19001	34201.953125	-15200.953125	19148.984375	-147.984375	18914.640625	86.359375	18989.695313	11.304688	19001.023438	0.023438
19009	34220.089844	-15211.089844	19159.648438	-150.648438	18925.328125	83.671875	19011.726563	-2.726563	19009.039063	0.039063
19013	34237.464844	-15224.464844	19169.500000	-156.500000	18935.308594	77.691406	19019.007813	-6.007813	19013.027344	0.027344
19031	34255.355469	-15224.355469	19179.949219	-148.949219	18945.757813	85.242188	19023.484375	7.515625	19031.035156	0.035156
19037	34273.617188	-15236.617188	19190.671875	-153.671875	18956.554688	80.445313	19041.828125	-4.828125	19037.031250	0.031250
19051	34289.187500	-15238.187500	19198.773438	-147.773438	18964.656250	86.343750	19045.121094	5.878906	19051.019531	0.019531
19069	34309.171875	-15240.171875	19211.226563	-142.226563	18977.234375	91.765625	19063.632813	5.367188	19069.054688	0.054688
19073	34326.609375	-15253.609375	19221.234375	-148.234375	18987.234375	85.765625	19079.039063	-6.039063	19073.039063	0.039063
19079	34345.351563	-15266.351563	19232.460938	-153.460938	18998.578125	80.421875	19084.386719	-5.386719	19079.042969	0.042969
19081	34362.296875	-15281.296875	19241.960938	-160.960938	19008.054688	72.945313	19088.503906	-7.503906	19081.027344	0.027344
19087	34379.500000	-15292.500000	19251.625000	-164.625000	19017.718750	69.281250	19090.699219	-3.699219	19087.035156	0.035156
19121	34395.609375	-15274.609375	19261.199219	-140.199219	19027.421875	93.578125	19096.718750	24.281250	19121.015625	0.015625
19139	34415.585938	-15276.585938	19272.750000	-133.750000	19038.980469	100.019531	19132.597656	6.402344	19139.039063	0.039063
19141	34433.402344	-15292.402344	19283.109375	-142.109375	19049.421875	91.578125	19149.484375	-8.484375	19141.042969	0.042969
19157	34451.562500	-15294.562500	19293.777344	-136.777344	19060.136719	96.863281	19151.746094	5.253906	19157.031250	0.031250
19163	34468.421875	-15305.421875	19303.218750	-140.218750	19069.640625	93.359375	19166.535156	-3.535156	19163.031250	0.031250
19181	34486.335938	-15305.335938	19313.621094	-132.621094	19080.199219	100.800781	19173.597656	7.402344	19181.039063	0.039063
19183	34503.960938	-15320.960938	19323.792969	-140.792969	19090.406250	92.593750	19191.246094	-8.246094	19183.039063	0.039063
19207	34522.117188	-15315.117188	19334.507813	-127.507813	19101.089844	105.910156	19193.718750	13.281250	19207.035156	0.035156
19211	34541.042969	-15330.042969	19345.914063	-134.914063	19112.746094	98.253906	19218.718750	-7.718750	19211.062500	0.062500
19213	34558.960938	-15345.960938	19356.398438	-143.398438	19123.261719	89.738281	19221.558594	-8.558594	19213.042969	0.042969
19219	34575.757813	-15356.757813	19365.746094	-146.746094	19132.667969	86.332031	19222.437500	-3.437500	19219.031250	0.031250
19231	34595.007813	-15364.007813	19377.546875	-146.546875	19144.476563	86.523438	19230.851563	0.148438	19231.042969	0.042969
19237	34611.968750	-15374.968750	19387.011719	-150.011719	19154.011719	82.988281	19240.574219	-3.574219	19237.039063	0.039063
19249	34629.984375	-15380.984375	19397.539063	-148.539063	19164.578125	84.421875	19247.609375	1.390625	19249.042969	0.042969
19259	34647.843750	-15388.843750	19407.882813	-148.882813	19175.000000	84.000000	19259.464844	-0.464844	19259.042969	0.042969
19267	34665.718750	-15398.718750	19418.324219	-151.324219	19185.437500	81.562500	19269.472656	-2.472656	19267.035156	0.035156
19273	34684.226563	-15411.226563	19429.324219	-156.324219	19196.527344	76.472656	19278.121094	-5.121094	19273.031250	0.031250
19289	34703.562500	-15414.562500	19439.171875	-150.171875	19206.421875	82.578125	19282.929688	6.070313	19289.035156	0.035156

NUMEROS PRIMOS - AJUSTES - DIFERENCIAS ABSOLUTAS
(PARA K = 4, 5, 6, ... 4999)

R. F. I.

PRIMO	AJUSTE # 1	DIFERENCIAS AJUSTE # 1	AJUSTE # 2	DIFERENCIAS AJUSTE # 2	AJUSTE # 3	DIFERENCIAS AJUSTE # 3	AJUSTE # 4	DIFERENCIAS AJUSTE # 4	AJUSTE # 5	DIFERENCIAS AJUSTE # 5
28181	50600.695313	-22419.695313	28486.210938	-305.210938	28164.230469	16.769531	28172.312500	8.687500	28180.980469	-0.019531
28183	50618.656250	-22435.656250	28496.367188	-313.367188	28174.343750	8.656250	28191.109375	-8.109375	28182.996094	-0.003906
28201	50636.578125	-22435.578125	28506.429688	-305.429688	28184.398438	16.601563	28193.050781	7.949219	28200.996094	-0.003906
28211	50654.007813	-22443.007813	28515.984375	-304.984375	28193.824219	17.175781	28210.410156	0.589844	28210.984375	-0.015625
28219	50673.585938	-22454.585938	28527.796875	-308.796875	28205.492188	13.507813	28222.652344	-3.652344	28218.984375	-0.015625
28229	50692.234375	-22463.234375	28538.632813	-309.632813	28216.234375	12.765625	28229.742188	-0.742188	28229.000000	0.0
28277	50710.335938	-22433.335938	28548.906250	-271.906250	28226.468750	50.531250	28239.226563	37.773438	28276.992188	-0.007813
28279	50730.671875	-22451.671875	28561.484375	-282.484375	28239.011719	39.988281	28289.558594	-10.558594	28279.015625	0.015625
28283	50748.609375	-22465.609375	28571.617188	-288.617188	28249.000000	34.000000	28288.976563	-5.976563	28282.988281	-0.011719
28289	50765.339844	-22476.339844	28580.453125	-291.453125	28257.953125	31.046875	28291.960938	-2.960938	28289.007813	0.007813
28297	50782.218750	-22485.218750	28589.578125	-292.578125	28266.960938	30.039063	28298.015625	-1.015625	28297.007813	0.007813
28307	50801.246094	-22494.246094	28600.812500	-293.812500	28278.042969	28.957031	28308.082031	-1.082031	28307.000000	0.0
28309	50820.230469	-22511.230469	28612.011719	-303.011719	28289.203125	19.796875	28318.148438	-9.148438	28308.988281	-0.011719
28319	50837.886719	-22518.886719	28621.812500	-302.812500	28298.945313	20.054688	28318.726563	0.273438	28318.984375	-0.015625
28349	50856.871094	-22507.871094	28632.937500	-283.937500	28310.007813	38.992188	28330.066406	18.933594	28349.003906	0.003906
28351	50875.261719	-22524.261719	28643.605469	-292.605469	28320.617188	30.382813	28359.617188	-8.617188	28351.007813	0.007813
28387	50893.937500	-22506.937500	28654.406250	-267.406250	28331.406250	55.593750	28361.773438	25.226563	28386.984375	-0.015625
28393	50911.734375	-22518.734375	28664.496094	-271.496094	28341.335938	51.664063	28396.929688	-3.929688	28393.000000	0.0
28403	50929.589844	-22526.589844	28674.507813	-271.507813	28351.417969	51.582031	28403.085938	-0.085938	28403.003906	0.003906
28409	50947.386719	-22538.386719	28684.492188	-275.492188	28361.433594	47.566406	28413.011719	-4.011719	28408.996094	-0.003906
28411	50966.695313	-22555.695313	28696.054688	-285.054688	28372.933594	38.066406	28420.500000	-9.500000	28411.000000	0.0
28429	50985.703125	-22556.703125	28707.320313	-278.320313	28383.937500	45.062500	28421.996094	7.003906	28428.992188	-0.007813
28433	51002.000000	-22569.000000	28715.839844	-282.839844	28392.593750	40.406250	28437.648438	-4.648438	28432.992188	-0.007813
28439	51021.343750	-22582.343750	28727.343750	-288.343750	28404.042969	34.957031	28444.457031	-5.457031	28439.007813	0.007813
28447	51038.875000	-22591.875000	28737.140625	-290.140625	28413.703125	33.296875	28448.656250	-1.656250	28446.996094	-0.003906
28463	51058.695313	-22595.695313	28749.203125	-286.203125	28425.640625	37.359375	28458.929688	4.070313	28462.992188	-0.007813
28477	51076.339844	-22599.339844	28758.960938	-281.960938	28435.453125	41.546875	28472.820313	4.179688	28477.007813	0.007813
28493	51096.125000	-22603.125000	28770.886719	-277.886719	28447.355469	45.644531	28488.914063	4.085938	28493.011719	0.011719
28499	51114.429688	-22615.429688	28781.492188	-282.492188	28457.886719	41.113281	28503.335156	-4.335156	28499.003906	0.003906
28513	51131.015625	-22618.015625	28790.226563	-277.226563	28466.609375	46.390625	28507.710938	5.289063	28512.988281	-0.011719
28517	51151.289063	-22634.289063	28802.734375	-285.734375	28479.031250	37.968750	28525.417969	-8.417969	28516.996094	-0.003906
28537	51167.679688	-22630.679688	28811.339844	-274.339844	28487.539063	49.460938	28525.492188	11.507813	28536.984375	-0.015625
28541	51187.339844	-22646.339844	28823.183594	-282.183594	28499.476563	41.523438	28548.941406	-7.941406	28541.003906	0.003906
28547	51204.917969	-22657.917969	28832.937500	-285.937500	28509.203125	37.796875	28550.718750	-3.718750	28546.992188	-0.007813
28549	51224.187500	-22675.187500	28844.460938	-295.460938	28520.574219	28.425781	28558.378906	-9.378906	28549.007813	0.007813
28559	51241.015625	-22682.015625	28853.453125	-294.453125	28529.523438	29.476563	28557.953125	1.046875	28559.003906	0.003906
28571	51260.406250	-22689.406250	28865.062500	-294.062500	28541.046875	29.953125	28570.523438	0.476563	28571.000000	0.0
28573	51278.062500	-22705.062500	28874.898438	-301.898438	28550.824219	22.175781	28580.773438	-7.773438	28572.996094	-0.003906
28579	51298.875000	-22719.875000	28887.859375	-308.859375	28563.765625	15.234375	28585.937500	-6.937500	28578.996094	-0.003906
28591	51314.792969	-22723.792969	28895.984375	-304.984375	28571.773438	19.226563	28587.003906	3.996094	28590.996094	-0.003906
28597	51332.953125	-22735.953125	28906.367188	-309.367188	28582.046875	14.953125	28601.261719	-4.261719	28596.988281	-0.011719
28603	51353.781250	-22750.781250	28919.371094	-316.371094	28594.980469	8.019531	28609.921875	-6.921875	28602.988281	-0.011719
28607	51369.886719	-22762.886719	28927.648438	-320.648438	28603.156250	3.843750	28611.175781	-4.175781	28607.000000	0.0
28619	51387.328125	-22768.328125	28937.214844	-318.214844	28612.578125	6.421875	28616.394531	2.605469	28618.972656	-0.027344
28621	51406.093750	-22785.093750	28948.031250	-327.031250	28623.417969	-2.417969	28629.832031	-8.832031	28620.992188	-0.007813
28627	51425.496094	-22798.496094	28959.683594	-332.683594	28634.843750	-7.843750	28632.421875	-5.421875	28626.996094	-0.003906
28631	51443.699219	-22812.699219	28969.984375	-338.984375	28645.105469	-14.105469	28637.257813	-6.257813	28630.996094	-0.003906
28643	51462.203125	-22819.203125	28980.648438	-337.648438	28655.605469	-12.605469	28641.492188	1.507813	28642.992188	-0.007813
28649	51481.453125	-22832.453125	28992.023438	-343.023438	28666.964844	-17.964844	28654.351563	-5.351563	28648.992188	-0.007813
28657	51498.140625	-22841.140625	29000.781250	-343.781250	28675.640625	-18.640625	28657.667969	-0.667969	28656.992188	-0.007813
28661	51516.007813	-22855.007813	29010.855469	-349.855469	28685.500000	-24.500000	28666.847656	-5.847656	28660.988281	-0.011719
28663	51534.386719	-22871.386719	29021.335938	-358.335938	28695.804688	-32.804688	28671.242969	-8.242969	28662.988281	-0.011719

N U M E R O S   P R I M O S   -   A J U S T E S   -   D I F E R E N C I A S   A B S O L U T A S

(PARA K = 4, 5, 6, . . . , 4999)

R. F. T.

	AJUSTE # 1	DIFERENCIAS AJUSTE # 1	AJUSTE # 2	DIFERENCIAS AJUSTE # 2	AJUSTE # 3	DIFERENCIAS AJUSTE # 3	AJUSTE # 4	DIFERENCIAS AJUSTE # 4	AJUSTE # 5	DIFERENCIAS AJUSTE # 5
3347	6179.367188	-2832.367188	3401.577881	-54.577881	3348.456787	-1.456787	3351.439209	-4.439209	3347.006836	0.006836
3359	6194.421875	-2835.421875	3409.989746	-50.989746	3356.756348	2.243652	3355.295654	3.704346	3358.996094	-0.003906
3361	6209.589844	-2848.585844	3418.544922	-57.544922	3365.230225	-4.230225	3367.476563	-6.476563	3361.002686	0.002686
3371	6224.636719	-2853.636719	3426.924072	-55.924072	3373.470703	-2.470703	3369.229980	1.770020	3370.989502	-0.010498
3373	6239.656250	-2866.656250	3435.289307	-62.289307	3381.717041	-8.717041	3379.239990	-6.239990	3372.993652	-0.006348
3389	6254.562500	-2865.562500	3443.486328	-54.486328	3389.739014	-0.739014	3381.000977	7.999023	3388.979004	-0.020996
3391	6269.667969	-2878.667969	3451.945801	-60.945801	3398.094971	-7.094971	3397.354004	-6.354004	3390.998047	-0.001953
3407	6284.777344	-2877.777344	3460.357910	-53.357910	3406.344238	0.655762	3399.231934	7.768066	3406.982666	-0.017334
3413	6299.875000	-2886.875000	3468.817871	-55.817871	3414.711914	-1.711914	3415.366455	-2.366455	3412.998779	-0.001221
3433	6315.125000	-2882.125000	3477.411377	-44.411377	3423.187256	9.812744	3421.470703	11.529297	3432.995361	-0.004639
3449	6330.289063	-2881.289063	3486.012207	-37.012207	3431.770508	17.229492	3441.605225	7.394775	3449.021973	0.021973
3457	6345.640625	-2888.640625	3494.863037	-37.863037	3440.665283	16.334717	3457.937744	-0.937744	3457.042969	0.042969
3461	6361.148438	-2900.148438	3503.861084	-42.861084	3449.696533	11.303467	3466.073486	-5.073486	3461.042236	0.042236
3463	6376.421875	-2913.421875	3512.584229	-49.584229	3458.414063	4.585938	3469.743164	-6.743164	3463.025635	0.025635
3467	6391.726563	-2924.726563	3521.283447	-54.283447	3467.050293	-0.050293	3471.645996	-4.645996	3467.009766	0.009766
3469	6406.835938	-2937.835938	3529.745117	-60.745117	3475.416992	-6.416992	3475.366211	-6.366211	3468.999512	-0.000488
3491	6421.906250	-2930.906250	3538.120117	-47.120117	3483.633545	7.366455	3477.201172	13.798828	3490.984619	-0.015381
3499	6437.210938	-2938.210938	3546.834229	-47.834229	3492.312256	6.687744	3499.695801	-0.695801	3499.017090	0.017090
3511	6452.523438	-2941.523438	3555.552490	-44.552490	3500.984863	10.015137	3507.688965	3.311035	3511.016357	0.016357
3517	6467.902344	-2950.902344	3564.363770	-47.363770	3509.781250	7.218750	3519.819336	-2.819336	3517.022949	0.022949
3527	6483.265625	-2956.265625	3573.135498	-46.135498	3518.509277	8.490723	3525.743652	1.256348	3527.015625	0.015625
3529	6499.648438	-2965.648438	3581.939209	-52.939209	3527.284424	1.715576	3535.794922	-6.794922	3529.019775	0.019775
3533	6513.906250	-2980.906250	3590.558838	-57.558838	3535.820801	-2.820801	3537.537109	-4.537109	3533.000732	0.000732
3539	6529.089844	-2990.089844	3599.065918	-60.065918	3544.209717	-5.209717	3541.382080	-2.382080	3538.993164	-0.006836
3541	6544.265625	-3003.265625	3607.548096	-66.548096	3552.547363	-11.547363	3547.325195	-6.325195	3540.987549	-0.012451
3547	6559.343750	-3012.343750	3615.876709	-68.876709	3560.685303	-13.685303	3549.111328	-2.111328	3546.973389	-0.026611
3557	6574.500000	-3017.500000	3624.265381	-67.265381	3568.867920	-11.867920	3555.150879	1.849121	3556.968262	-0.031738
3559	6589.500000	-3030.500000	3632.509277	-73.509277	3576.916016	-17.916016	3565.021240	-6.021240	3558.973145	-0.026855
3571	6604.507813	-3033.507813	3640.711426	-69.711426	3584.875244	-13.875244	3566.919189	4.080811	3570.959961	-0.040039
3581	6619.484375	-3038.484375	3648.913086	-67.913086	3592.864258	-11.864258	3578.957764	2.042236	3580.968750	-0.031250
3583	6634.679688	-3051.679688	3657.345703	-74.345703	3601.102295	-18.102295	3589.210449	-6.210449	3582.972412	-0.027588
3593	6649.578125	-3056.578125	3665.429688	-72.429688	3608.943848	-15.943848	3590.802002	2.197998	3592.960449	-0.039551
3607	6664.703125	-3057.703125	3673.755127	-66.755127	3617.041748	-10.041748	3601.062012	5.937988	3606.964111	-0.035889
3613	6679.796875	-3066.796875	3682.093750	-69.093750	3625.198486	-12.198486	3615.133789	-2.133789	3612.977051	-0.022949
3617	6694.898438	-3077.898438	3690.423096	-73.423096	3633.329590	-16.329590	3621.103516	-4.103516	3616.972412	-0.027588
3623	6709.906250	-3086.906250	3698.621338	-75.621338	3641.295166	-18.295166	3624.929443	-1.929443	3622.963867	-0.036133
3631	6724.906250	-3093.906250	3706.795410	-75.795410	3649.224854	-18.224854	3630.889648	0.110352	3630.959961	-0.040039
3637	6739.882813	-3102.882813	3714.942383	-77.942383	3657.124756	-20.124756	3638.860107	-1.860107	3636.960205	-0.039795
3643	6754.792969	-3111.792969	3723.006348	-80.006348	3664.928711	-21.928711	3644.760742	-1.760742	3642.956787	-0.043213
3659	6769.604688	-3110.604688	3731.156006	-72.156006	3672.802002	-13.802002	3650.825928	8.174072	3658.952637	-0.047363
3671	6784.796875	-3113.796875	3739.349459	-68.349459	3680.779297	-9.779297	3666.947021	4.052979	3670.969727	-0.030273
3673	6799.914063	-3126.914063	3747.692627	-74.692627	3688.942383	-15.942383	3679.141113	-6.141113	3672.978027	-0.021973
3677	6814.953125	-3137.953125	3755.907227	-78.907227	3696.929688	-19.929688	3680.952637	-3.952637	3676.965332	-0.034668
3691	6829.953125	-3138.953125	3764.049561	-73.049561	3704.812744	-13.812744	3684.840332	6.159668	3690.957275	-0.042725
3697	6844.953125	-3147.953125	3772.239502	-75.239502	3712.791748	-15.791748	3698.949219	-1.949219	3696.970215	-0.029785
3701	6856.078125	-3155.078125	3780.536133	-79.536133	3720.857666	-19.857666	3705.031250	-4.031250	3700.965332	-0.034668
3709	6875.007813	-3166.007813	3788.601807	-79.601807	3728.666260	-19.666260	3708.766602	0.233398	3708.958008	-0.041992
3719	6889.937500	-3170.937500	3796.668213	-77.668213	3736.474121	-17.474121	3716.766602	2.233398	3718.958740	-0.041260
3727	6904.890625	-3177.890625	3804.772461	-77.772461	3744.335930	-17.335930	3726.824951	0.175049	3726.963135	-0.036865
3733	6919.953125	-3186.953125	3812.984375	-79.984375	3752.305420	-19.305420	3734.932373	-1.932373	3732.962891	-0.037109
3739	6934.765625	-3195.765625	3820.927246	-81.927246	3759.995117	-20.995117	3740.649902	-1.649902	3738.960205	-0.039795
3761	6949.796875	-3188.796875	3829.075928	-68.075928	3767.678779	-6.678779	3746.834473	14.165527	3760.955811	-0.044189

NUMEROS PRIMOS - AJUSTES - DIFERENCIAS ABSOLUTAS
(PARA K = 4, 5, 6, . . . , 4999)

PRIMO	AJUSTE # 1	DIFERENCIAS AJUSTE # 1	AJUSTE # 2	DIFERENCIAS AJUSTE # 2	AJUSTE # 3	DIFERENCIAS AJUSTE # 3	AJUSTE # 4	DIFERENCIAS AJUSTE # 4	AJUSTE # 5	R. F. I. DIFERENCIAS AJUSTE # 5
47441	84597.062500	-37156.062500	47900.429688	-459.429688	47379.855469	61.144531	47445.417969	-4.417969	47440.984375	-0.015625
47459	84615.187500	-37156.187500	47910.421875	-451.421875	47389.734375	69.265625	47450.878906	8.121094	47459.000000	0.0
47491	84634.500000	-37143.500000	47921.687500	-430.687500	47400.968750	90.031250	47470.222656	20.777344	47490.988281	-0.011719
47497	84654.375000	-37157.375000	47933.375000	-436.375000	47412.789063	84.210938	47502.812500	-5.812500	47496.992188	-0.007813
47501	84671.875000	-37170.875000	47942.949219	-441.949219	47422.140625	78.859375	47506.347656	-5.347656	47500.996094	-0.003906
47507	84690.562500	-37183.562500	47953.542969	-446.542969	47432.718750	74.281250	47511.562500	-4.562500	47506.984375	-0.015625
47513	84707.625000	-37194.625000	47962.480469	-449.480469	47441.609375	71.390625	47515.898438	-2.898438	47513.007813	0.007813
47521	84726.625000	-37205.625000	47973.476563	-452.476563	47452.476563	68.523438	47523.839844	-2.839844	47520.972656	-0.027344
47527	84750.750000	-37223.750000	47989.390625	-462.390625	47468.558594	58.441406	47537.093750	-10.093750	47527.011719	0.011719
47533	84768.750000	-37235.750000	47999.312500	-466.312500	47478.375000	54.625000	47536.781250	-3.781250	47532.964844	-0.035156
47543	84789.562500	-37246.562500	48011.109375	-468.109375	47489.886719	53.113281	47544.503906	-1.503906	47542.992188	-0.007813
47563	84804.250000	-37241.250000	48018.648438	-455.648438	47497.417969	65.582031	47550.503906	12.496094	47562.972656	-0.027344
47569	84823.687500	-37254.687500	48029.937500	-460.937500	47508.789063	60.210938	47574.347656	-5.347656	47568.976563	-0.023438
47581	84846.062500	-37265.062500	48044.179688	-463.179688	47522.964844	58.035156	47583.148438	-2.148438	47580.972656	-0.027344
47591	84864.937500	-37273.937500	48055.015625	-464.015625	47533.761719	57.238281	47591.785156	-0.785156	47590.988281	-0.011719
47599	84881.437500	-37282.437500	48063.406250	-464.406250	47542.039063	56.960938	47599.253906	-0.253906	47598.976563	-0.023438
47609	84902.000000	-37293.000000	48075.855469	-466.855469	47554.468750	54.531250	47611.429688	-2.429688	47609.000000	0.0
47623	84918.562500	-37295.562500	48084.414063	-461.414063	47562.765625	60.234375	47617.285156	5.714844	47622.988281	-0.011719
47629	84941.875000	-37312.875000	48099.578125	-470.578125	47577.929688	51.070313	47638.140625	-9.140625	47628.976563	-0.023438
47639	84957.000000	-37318.000000	48106.605469	-467.605469	47584.867188	54.132813	47635.917969	3.082031	47638.980469	-0.019531
47653	84980.187500	-37327.187500	48121.699219	-468.699219	47599.984375	53.015625	47654.093750	-1.093750	47652.976563	-0.023438
47657	84991.875000	-37334.875000	48125.296875	-468.296875	47603.468750	53.531250	47656.445313	0.554688	47656.960938	-0.039063
47659	85015.875000	-37356.875000	48141.218750	-482.218750	47619.335938	39.664063	47672.875000	-13.875000	47659.007813	0.007813
47681	85035.750000	-37354.750000	48152.949219	-471.949219	47631.011719	49.988281	47670.664063	10.335938	47680.988281	-0.011719
47699	85053.062500	-37354.062500	48162.062500	-463.062500	47640.156250	58.843750	47690.128906	8.871094	47698.984375	-0.015625
47701	85075.687500	-37374.687500	48176.687500	-475.687500	47654.640625	46.359375	47713.492188	-12.492188	47701.007813	0.007813
47711	85090.625000	-37379.625000	48183.464844	-472.464844	47661.375000	49.625000	47707.734375	3.265625	47711.000000	0.0
47713	85114.187500	-37401.187500	48198.984375	-485.984375	47676.750000	36.250000	47726.355469	-13.355469	47712.980469	-0.019531
47717	85130.000000	-37413.000000	48206.539063	-489.539063	47684.460938	32.539063	47720.703125	-3.703125	47716.992188	-0.007813
47737	85146.250000	-37409.250000	48214.718750	-477.718750	47692.453125	44.546875	47724.972656	12.027344	47736.980469	-0.019531
47741	85168.187500	-37427.187500	48223.562500	-482.562500	47706.167969	34.832031	47750.707031	-9.707031	47740.992188	-0.007813
47743	85188.687500	-37445.687500	48240.968750	-497.968750	47718.539063	24.460938	47753.351563	-10.351563	47742.980469	-0.019531
47777	85207.062500	-37430.062500	48251.199219	-474.199219	47728.656250	49.343750	47753.097656	23.902344	47776.980469	-0.019531
47779	85224.562500	-37445.562500	48260.531250	-481.531250	47738.042969	40.957031	47786.390625	-7.390625	47779.003906	0.003906
47791	85245.875000	-37454.875000	48273.765625	-482.765625	47751.089844	39.910156	47792.027344	-1.027344	47790.980469	-0.019531
47797	85264.000000	-37467.000000	48283.765625	-486.765625	47760.996094	36.003906	47800.894531	-3.894531	47796.988281	-0.011719
47807	85281.625000	-37474.625000	48293.273438	-486.273438	47770.468750	36.531250	47806.457031	0.542969	47806.984375	-0.015625
47809	85303.750000	-37494.750000	48307.234375	-498.234375	47784.390625	24.609375	47820.890625	-11.890625	47808.968750	-0.031250
47819	85320.875000	-37501.875000	48316.312500	-497.312500	47793.304688	25.695313	47817.914063	1.085938	47819.000000	0.0
47837	85342.875000	-37505.875000	48330.203125	-493.203125	47807.085938	29.914063	47832.753906	4.246094	47836.972656	-0.027344
47843	85360.437500	-37517.437500	48339.617188	-496.617188	47816.480469	26.519531	47846.394531	-3.394531	47843.000000	0.0
47857	85379.750000	-37522.750000	48350.843750	-493.843750	47827.523438	29.476563	47854.023438	2.976563	47856.980469	-0.019531
47869	85394.875000	-37525.875000	48357.730469	-488.730469	47834.468750	34.531250	47863.937500	5.062500	47868.992188	-0.007813
47881	85418.312500	-37537.312500	48373.074219	-492.074219	47849.679688	31.320313	47884.175781	-3.175781	47880.964844	-0.035156
47903	85435.750000	-37532.750000	48382.367188	-479.367188	47858.812500	44.187500	47890.121094	12.878906	47902.988281	-0.011719
47911	85457.187500	-37546.187500	48395.714844	-484.714844	47872.218750	38.781250	47916.410156	-5.410156	47911.003906	0.003906
47917	85473.562500	-37556.562500	48403.929688	-486.929688	47880.312500	36.687500	47919.078125	-2.078125	47916.984375	-0.015625
47933	85494.000000	-37561.000000	48416.261719	-483.261719	47892.671875	40.328125	47929.347656	3.652344	47932.988281	-0.011719
47939	85512.312500	-37573.312500	48426.453125	-487.453125	47902.710938	36.289063	47943.000000	-4.000000	47938.960938	-0.039063
47947	85533.687500	-37586.687500	48439.820313	-492.820313	47915.875000	31.125000	47952.156250	-5.156250	47946.992188	-0.007813
47951	85550.125000	-37599.125000	48448.058594	-497.058594	47924.132813	26.867188	47955.253906	-4.253906	47950.996094	-0.003906
47963	85570.937500	-37607.937500	48460.664063	-497.664063	47936.695313	26.304688	47963.527344	-0.527344	47962.964844	-0.035156

R. F. I.

NUMEROS PRIMOS - AJUSTES - DIFERENCIAS ABSOLUTAS

(PARA K = 4, 5, 6, . . . , 4999)

PRIMO	AJUSTE # 1	DIFERENCIAS AJUSTE # 1	AJUSTE # 2	DIFERENCIAS AJUSTE # 2	AJUSTE # 3	DIFERENCIAS AJUSTE # 3	AJUSTE # 4	DIFERENCIAS AJUSTE # 4	AJUSTE # 5	DIFERENCIAS AJUSTE # 5
47969	85589.437500	-37620.437500	48471.136719	-502.136719	47947.027344	21.972656	47973.316406	-4.316406	47968.984375	-0.015625
47977	85609.312500	-37632.312500	48482.859375	-505.859375	47958.746094	18.253906	47980.699219	-3.699219	47976.980469	-0.019531
47981	85628.812500	-37647.812500	48494.187500	-513.187500	47970.046875	10.953125	47988.296875	-7.296875	47980.996094	-0.003906
48017	85645.687500	-37628.687500	48503.015625	-486.015625	47978.640625	38.359375	47989.574219	27.425781	48016.980469	-0.019531
48023	85663.750000	-37640.750000	48512.824219	-489.824219	47988.453125	34.546875	48026.800781	-3.800781	48022.988281	-0.011719
48029	85681.875000	-37652.875000	48522.843750	-493.843750	47998.343750	30.656250	48032.855469	-3.855469	48028.964844	-0.035156
48049	85705.000000	-37656.000000	48537.921875	-488.921875	48013.281250	35.718750	48043.914063	5.085938	48048.976563	-0.023438
48073	85723.562500	-37650.562500	48548.304688	-475.304688	48023.667969	49.332031	48059.390625	13.609375	48073.003906	0.003906
48079	85742.500000	-37663.500000	48559.136719	-480.136719	48034.445313	44.554688	48083.781250	-4.781250	48079.003906	0.003906
48091	85761.437500	-37670.437500	48569.960938	-478.960938	48045.171875	45.828125	48089.707031	1.292969	48090.980469	-0.019531
48109	85777.625000	-37668.625000	48578.078125	-469.078125	48053.187500	55.812500	48099.011719	9.988281	48108.996094	-0.003906
48119	85797.812500	-37678.812500	48590.093750	-471.093750	48065.230469	53.769531	48121.015625	-2.015625	48118.972656	-0.027344
48121	85819.875000	-37698.875000	48604.089844	-483.089844	48079.179688	41.820313	48132.960938	-11.960938	48121.011719	0.011719
48131	85836.875000	-37705.875000	48613.011719	-482.011719	48087.949219	43.050781	48129.773438	1.226563	48131.003906	0.003906
48157	85857.125000	-37700.125000	48624.992188	-467.992188	48099.968750	57.031250	48142.996094	14.003906	48156.976563	-0.023438
48163	85879.312500	-37716.312500	48639.199219	-476.199219	48114.078125	48.921875	48171.113281	-8.113281	48163.003906	0.003906
48179	85893.437500	-37714.437500	48645.179688	-466.179688	48119.917969	59.082031	48168.835938	10.164063	48178.996094	-0.003906
48187	85917.000000	-37730.000000	48660.609375	-473.609375	48135.359375	51.640625	48194.437500	-7.437500	48186.996094	-0.003906
48193	85933.062500	-37740.062500	48668.601563	-475.601563	48143.324219	49.675781	48194.929688	-1.929688	48192.964844	-0.035156
48197	85953.562500	-37756.562500	48680.949219	-483.949219	48155.609375	41.390625	48205.253906	-8.253906	48196.968750	-0.031250
48221	85971.125000	-37750.125000	48690.437500	-469.437500	48164.968750	56.031250	48206.351563	14.648438	48220.992188	-0.007813
48239	85989.437500	-37750.437500	48700.593750	-461.593750	48175.085938	63.914063	48231.089844	7.910156	48238.972656	-0.027344
48247	86008.875000	-37761.875000	48711.953125	-464.953125	48186.406250	60.593750	48250.328125	-3.328125	48247.007813	0.007813
48259	86026.750000	-37767.750000	48721.734375	-462.734375	48196.000000	63.000000	48256.578125	2.421875	48258.984375	-0.015625
48271	86049.187500	-37778.187500	48736.011719	-465.011719	48210.328125	60.671875	48273.316406	-2.316406	48270.988281	-0.011719
48281	86064.687500	-37783.687500	48743.460938	-462.460938	48217.718750	63.281250	48278.371094	2.628906	48280.980469	-0.019531
48299	86087.937500	-37788.937500	48758.648438	-459.648438	48232.761719	66.238281	48296.054688	2.945313	48299.011719	0.011719
48311	86106.875000	-37795.875000	48769.324219	-458.324219	48243.574219	67.425781	48309.824219	1.175781	48311.011719	0.011719
48313	86124.375000	-37811.375000	48778.859375	-465.859375	48252.906250	60.093750	48320.320313	-7.320313	48312.988281	-0.011719
48337	86143.250000	-37806.250000	48789.667969	-452.667969	48263.609375	73.390625	48323.671875	13.328125	48336.968750	-0.031250
48341	86163.250000	-37822.250000	48801.492188	-460.492188	48275.542969	65.457031	48348.925781	-7.925781	48340.992188	-0.007813
48353	86182.250000	-37829.250000	48812.359375	-459.359375	48286.296875	66.703125	48351.730469	1.269531	48352.976563	-0.023438
48371	86201.500000	-37830.500000	48823.601563	-452.601563	48297.464844	73.535156	48364.156250	6.843750	48370.988281	-0.011719
48383	86219.812500	-37836.812500	48833.781250	-450.781250	48307.652344	75.347656	48381.179688	1.820313	48382.992188	-0.007813
48397	86241.062500	-37844.062500	48846.949219	-449.949219	48320.773438	76.226563	48396.117188	0.882813	48396.996094	-0.003906
48407	86257.625000	-37850.625000	48855.398438	-448.398438	48329.187500	77.812500	48405.417969	1.582031	48407.003906	0.003906
48409	86277.312500	-37868.312500	48867.011719	-458.011719	48340.593750	68.406250	48418.410156	-9.410156	48409.003906	0.003906
48413	86295.562500	-37882.562500	48877.234375	-464.234375	48350.828125	62.171875	48419.207031	-6.207031	48412.972656	-0.027344
48437	86316.437500	-37879.437500	48889.886719	-452.886719	48363.511719	73.488281	48425.683594	11.316406	48437.000000	0.0
48449	86333.937500	-37884.937500	48899.273438	-450.273438	48372.859375	76.140625	48446.343750	2.656250	48448.996094	-0.003906
48463	86355.562500	-37892.562500	48912.855469	-449.855469	48386.335938	76.664063	48462.472656	0.527344	48462.996094	-0.003906
48473	86374.687500	-37901.687500	48923.875000	-450.875000	48397.281250	75.718750	48473.941406	-0.941406	48472.996094	-0.003906
48479	86394.812500	-37915.812500	48935.949219	-456.949219	48409.386719	69.613281	48485.097656	-6.097656	48478.992188	-0.007813
48481	86415.625000	-37934.625000	48948.593750	-467.593750	48422.031250	58.968750	48491.621094	-10.621094	48480.976563	-0.023438
48487	86434.000000	-37947.000000	48958.875000	-471.875000	48432.203125	54.796875	48491.136719	-4.136719	48486.964844	-0.035156
48491	86451.812500	-37960.812500	48968.593750	-477.593750	48441.804688	49.195313	48496.593750	-5.593750	48490.992188	-0.007813
48497	86471.562500	-37974.562500	48980.277344	-483.277344	48453.402344	43.597656	48502.566406	-5.566406	48496.968750	-0.031250
48523	86490.250000	-37967.250000	48990.796875	-467.796875	48463.949219	59.050781	48507.531250	15.468750	48522.984375	-0.015625
48527	86509.125000	-37982.125000	48998.601563	-471.601563	48471.589844	55.410156	48530.617188	-3.617188	48526.976563	-0.023438
48533	86528.250000	-37995.250000	49012.621094	-479.621094	48485.546875	47.453125	48540.941406	-7.941406	48532.984375	-0.015625
48539	86546.687500	-38007.687500	49022.851563	-483.851563	48495.890625	43.109375	48543.339844	-4.339844	48538.996094	-0.003906
48541	86566.125000	-38025.125000	49034.296875	-493.296875	48507.074219	33.925781	48550.187500	-5.187500	48541.003906	0.003906