S (16):

$$u_3^2] \left[\frac{K_2}{u_3(1] 1/R)x_2} \right] (q 1[\frac{1}{x} \setminus K_1 . \quad (23)$$

E K_2 x_h,

$$u_3^2] \left[\frac{m_h u_h x_h^2}{u_3 x_2} \right] (q 1[\frac{1}{x} \setminus K_1$$

$$\setminus u_h^2] (m_h)] f_h q , \quad (24)$$

$$f \equiv (1[\frac{1}{x} , \quad (25)$$

$$f_h \setminus (1[\frac{1}{x_h} . \quad (26)$$

E (24)

$$u_3^2[\frac{1}{2} (u_3^2) \setminus \frac{x_h^2}{x_h^2} [\frac{1}{2} (u_h^2)] u_h^2] (q \frac{1}{x}[\frac{1}{x_h} . \quad (27)$$

T (27) :

$$\frac{du_3}{dx} 2u_3[\frac{1}{u_3} \setminus \frac{1}{x} 2[\frac{(q}{x} . \quad (28)$$

T (28)

$$x_{3c} \setminus \frac{(q}{2} . \quad (29)$$

A T $(du_3/dx \setminus 0)$ (P 1963), R3 x_{3c},

$$u_{3c}^2 \setminus \frac{1}{3} . \quad (30)$$

E (29) (30) R3 $x_{3c}[x_h$ F (29), x_{3c} r_0 $k_1 r_2$. T R3 R3 x_h E (27) x_{3c} u_h x_h:

$$2u_h^2[(u_h^2) \setminus 2 \frac{(q}{x_h}[3] 32 \frac{x_h}{(q} . \quad (31)$$

3.2. *Mathematical Solution in R2*

E (11) (13) m_2

$$y_2 \setminus \frac{u_0}{u_2} u_2^2[u_0^2] (q 1[\frac{1}{x} . \quad (32)$$

A $x \setminus x_h$, R1 (14),

$$y_2(x_h) \equiv y_h \setminus 1] \frac{1}{R} x_h^2 . \quad (33)$$

(32) (33) x_h

$$1] \frac{1}{R} x_h^2 \setminus \frac{u_0}{u_h} u_h^2[u_0^2] (q 1[\frac{1}{x_h} . \quad (34)$$

T u_0 , R3. B (34)

$$u_h^2[u_0^2] (q 1[\frac{1}{x_h} \setminus \frac{u_h}{u_0} x_h^2 1] \frac{1}{R} . \quad (35)$$

T ,

$$z_h \equiv \frac{x_h}{(q} , \quad (36)$$

$$j \equiv (2q^2 1] \frac{1}{R} . \quad (36)$$

(35) (31)

$$u_0^2[(u_0) \setminus (q [\frac{3}{2}] \frac{5}{2} (2)[(j) \equiv C , \quad (37)$$

, C, , R. E (37) P68. I u_0 R3, (31) . T , u_0, S R3. G , (37) . T u_2 m_2 (13) (15)

$$1] \frac{1}{b_{20}} \setminus u_0^2[u_2^2] (1[\frac{1}{x} (1[q)$$

$$] \frac{1}{b_{20}} \frac{u_2^2}{u_0^2} 2(u_0^2[u_2^2)] (1[\frac{1}{x} (1[2q) , \quad (38)$$

(14) P68. (38)

$$\frac{du_2}{dx} u_0^2 u_2^2[u_0^2] (q 1[\frac{1}{x} [\frac{1}{b_{20}} (1[2u_2^2)$$

$$\setminus \frac{(}{2u_2 x_2} \frac{u_2^2}{b_{20}} (1[2q)[u_0^2(q[1)$$

$$] u_2^2[u_0^2] (q 1[\frac{1}{x} . \quad (39)$$

T (19) (20) . T x_h, $y_1]$ 0. B

S , . T. P , -r2 R2 (K & H 1976; L & H 1990). T. . H , P68. O P68. T. qD 1, P68 q\ 1 T. P68 . . .

3.3. *Mathematical Solution for* q\ 1

T. q\ 1 P68 . F , (39) (16) P68 q\ 1; . .,

$$\frac{du_2}{dx} \quad u_2^2 \quad u_2^2 [\quad u_2^2] \quad (q \quad 1[\quad \frac{1}{x} \quad [\quad \frac{1}{b_{20}} \quad (1[\quad 2u_2^2)$$

$$\backslash [\quad \frac{(\quad u_2}{2x2b_{20}} . \qquad (40)$$

F , $u_2^2 \backslash \frac{1}{2}$, (30) R3. I $u_2^2 \backslash \frac{1}{2}$ - (40) . T. , . T. , du_2/dx . S , q\ 1 R3. r_0 R3. T. , , R3 q\ 1, ° 3.1 . I P68 x_h^1 (/4, R3. T. , $T_{1,max}$ (R, ( ), -

$$\frac{1}{2}(\quad [\quad 2 \quad (\quad \backslash \quad (1] \quad 1/R \quad)] \quad 2[\quad 4 \quad 2 , \qquad (41)$$

(min (min (P $1/T_1$.

I P68 . T. R2. T. , , R. T . T. .

3.4. *Solution Isomorphism*

N , . T , (, b_{20} u_0, (37), n_0 B (k/T_1, k T_1 . F , u_0 R k/T_2. E - (37) u_0 k/T_2 ((q \ ), R u_0 . F , b_{20} $N_{20}T_2/B_{20}^2$. C $N_{20}T_2/B_{20}^2$ T_2 b_{20} . T. k (k/T_2), T_1 (k. R, k, T_2, T_1 . A P68, k\ 0.69, k. T. , k , . ., 0.56, T_2 R u_0 . T. N_{20}/B_{20}^2 T_2 b_{20} F , T_1 . T.

$$(\backslash ((k/T_1) , \qquad (42)$$

$$u_0 \backslash u_0(R, k/T_2) , \qquad (42)$$

$$b_{20} \backslash b_{20}(N_{20}T_2/B_{20}^2) . \qquad (42)$$

P68 k\ 0.69 k\ 0.56. (E 6 , - , 2 P68.) T. P68 $N_{20}\backslash 2] 108$ ~3, $T_1\backslash T_2\backslash 1.5] 106$ K, $B_{20}\backslash$ 0.5–2 G. $B_{20}\backslash 2$ G. T T_1 $T_2\backslash 1.22] 106$ K, k_{new}/k_{old} B k_{old} P68, (42) R ( ). T. $B_{20}\backslash 1.80$ G, b_{20} 0.52. O $T_1\backslash T_2$ B_{20} . T. (10)–(12) , .

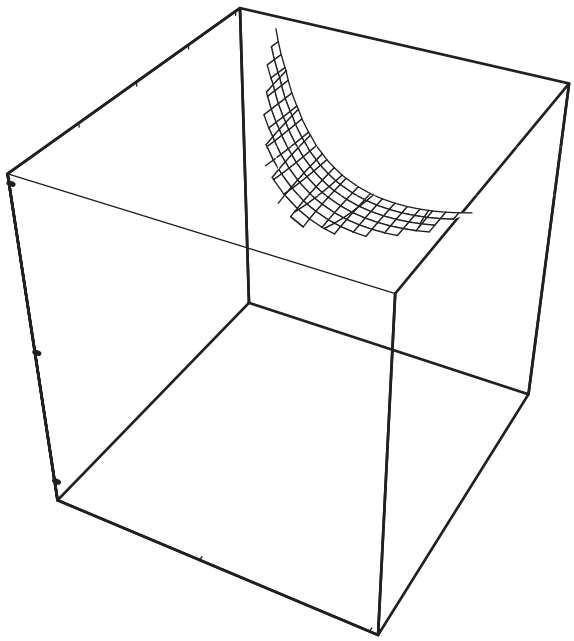
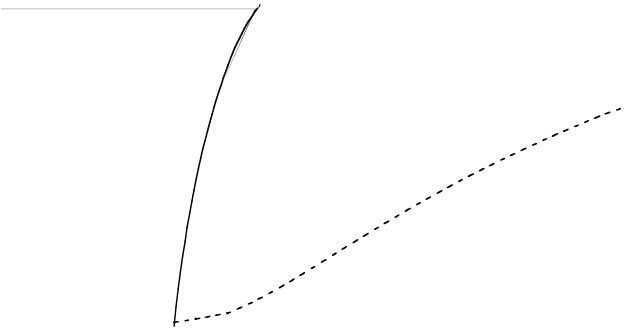
3.5. *Character of the Solution Space*

T. , T_1, T_2, R, b_{20} k\ 0.56 r_0, b_{20} (38) x_h

$$u_h^2[\quad u_h^2 \quad u_h^2 \quad (38)$$

$$\frac{u_h^2}{u_0^2} \backslash (1] \quad b_{20}) \quad f(2q[\quad 1) \quad [\quad b_{20} \quad (fq) . \qquad (43)$$

T. (25) P68. N - (34) u_h^2/u_0^2 (38),

$$\frac{u_h}{u_0} \quad 1] \quad \frac{1}{R} \quad x_h^2 \backslash \quad (qf_h) , \qquad (44)$$

$$(1] \quad b_{20}) \quad f(q[\quad 1) \quad [\quad b_{20} \backslash \frac{(fq)}{x_h^4(1] \quad 1/R)2} . \qquad (45)$$