Iteration	Increment in variables	R_x	R_y	R_z	Operation
5th	$\delta z = \frac{0.0013}{10} = 0.0001$	0.0006	0.0007	0.0003	$L_{17} = L_{16} + 0.0001L_3$
	$\delta y = \frac{0.0007}{10} = 0.00007$	0.00074	0	0.00037	$L_{18} = L_{17} + 0.00007L_2$
	$\delta x = \frac{0.00074}{10} = 0.00007$	0.00004	0.00007	0.00044	$L_{19} = L_{18} + 0.00007L_1$

Clearly residuals are reduced at 3 places of decimal or almost zero, then

$$\sum \delta x = 0.932 + 0.0616 + 0.0058 + 0.0005 + 0.00007 = 0.99997 \sim 1$$

$$\sum \delta y = 0.86 + 0.1290 + 0.0100 + 0.0009 + 0.00007 = 0.99997 \sim 1$$

and $$\sum \delta z = 0.8 + 0.1792 + 0.0191 + 0.0015 + 0.0001 = 0.99990 \sim 1$$

Thus, $x = 1$, $y = 1$ and $z = 1$

Iteration	Increment in variables	R_x	R_y	R_z	Operation
3rd	$\delta z = \frac{0.1906}{10} = 0.0191$	0.0386	0.1002	−0.0004	$L_{11} = L_{10} + 0.0191L_3$
	$\delta y = \frac{0.1002}{10} = 0.0100$	0.0586	0.0002	0.0096	$L_{12} = L_{11} + 0.0100L_2$
	$\delta x = \frac{0.0586}{10} = 0.0058$	0.0006	0.0060	0.0154	$L_{13} = L_{12} + 0.0058L_1$
4th	$\delta z = \frac{0.0154}{10} = 0.0015$	0.0036	0.0090	0.0004	$L_{14} = L_{13} + 0.0015L_3$
	$\delta y = \frac{0.0090}{10} = 0.0009$	0.0054	0	0.0013	$L_{15} = L_{14} + 0.0009L_2$
	$\delta x = \frac{0.0054}{10} = 0.0005$	0.0004	0.0005	0.0013	$L_{16} = L_{15} + 0.0005L_1$

The Relaxation table is: $R_x = 6 - 10x + 2y + 2z$, $R_y = 7 + x - 10y + 2z$ & $R_z = 8 + x + y - 10z$

Iteration	Increment in variables	R_x	R_y	R_z	Operation
1st	$x = y = z = 0$	6	7	8	L_4
	$\delta z = \frac{8}{10} = 0.8$	7.6	8.6	0	$L_5 = L_4 + 0.8L_3$
	$\delta y = \frac{8.6}{10} = 0.86$	9.32	0	0.86	$L_6 = L_5 + 0.86L_2$
	$\delta x = \frac{9.32}{10} = 0.932$	0	0.932	1.7920	$L_7 = L_6 + 0.932L_1$
	$\delta z = \frac{1.792}{10} = 0.1792$	0.3584	1.2904	0	$L_8 = L_7 + 0.1792L_3$
	$\delta y = \frac{1.2904}{10} = 0.1290$	0.6164	0.0004	0.1290	$L_9 = L_8 + 0.1290L_2$
	$\delta x = \frac{0.6164}{10} = 0.0616$	0.0004	0.0620	0.1906	$L_{10} = L_9 + 0.0616L_1$

$$\delta R_x = -10\delta x,\ \delta R_y = -10\delta y\ \ and\ \ \delta R_z = -10\delta z$$

The table for operation is:

Increment in variables	δR_x	δR_y	δR_z	
$\delta x = 1$	–10	1	1	L_1
$\delta y = 1$	2	–10	1	L_2
$\delta z = 1$	2	2	–10	L_3

Solve by Relaxation iteration method: $10x - 2y - 2z = 6$, $-x + 10y - 2z = 7$ and $-x - y + 10z = 8$

Solution: Given system of equations is,

$$10x - 2y - 2z = 6 \quad \ldots (1)$$

$$-x + 10y - 2z = 7 \quad \ldots (2)$$

$$-x - y + 10z = 8 \quad \ldots (3)$$

Clearly the coefficient matrix of the given system is diagonally dominant *i.e.*,

$$|10| > |-2| + |-2|, \ |10| > |-1| + |-2| \ \text{and} \ |10| > |-1| + |-1|$$

The Residuals from equation (1), (2) and (3), we have

$$R_x = 6 - 10x + 2y + 2z \quad \ldots (4)$$

$$R_y = 7 + x - 10y + 2z \quad \ldots (5)$$

$$R_z = 8 + x + y - 10z \quad \ldots (6)$$

From equation (4), (5) and (6), we get

$$\delta R_x = -10\delta x, \ \delta R_y = -10\delta y \ \text{and} \ \delta R_z = -10\delta z$$