**Algebra of IS Curve**

(Version for those with some knowledge or even a faint recollection of differential calculus)

By definition, National Income, Y = C + I + G – T + X – M

C = Consumption (Flow variable)

I = Investment (Flow variable)

G = Government Expenditure (Flow variable)

T = Tax Revenue (Flow variable)

X = Exports (Flow variable)

M = Imports (Flow variable)

Assuming G = T and X = M then G – T + X – M = 0

and Y = C + I.

Now, assuming C = f (Y) and I = g (r),

assuming further

1. that 0 < dC/dY < 1

and

1. that dI/dr < 0

and in fact, more specifically, that

1. f (Y) = a + k.Y where 0 < k < 1,

Then Y = a + kY + g(r)

⇒ Y – k.Y = g(r) + a

⇒ (1 – k).Y = g(r) + a

⇒ Y = g(r) + a

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1. – k)

⇒ dY/dr = g ‘ (r) [ g’(r) = dI/dr ]

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1. – k)

Thus dY/dr = ( - ) /( + ) = ( - )

(Version for those with no knowledge nor even any acquaintance with differential calculus)

By definition, National Income, Y = C + I + G – T + X – M

C = Consumption (Flow variable)

I = Investment (Flow variable)

G = Government Expenditure (Flow variable)

T = Tax Revenue (Flow variable)

X = Exports (Flow variable)

M = Imports (Flow variable)

Assuming G = T and X = M then G – T + X – M = 0

and Y = C + I.

Assuming specifically, that

C = f (Y) = a + k.Y where 0 < k < 1,

and I = g(r) = b + m.r where m < 0 [ a ≥ 0, b ≥ 0 ]

Then Y = a + kY + b + m.r

⇒ Y – k.Y = a + b + m.r

⇒ (1 – k).Y = a + b + m.r

⇒ Y = a + b + m.r

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1. – k)

⇒ ΔY = m. Δr

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(1 - k)

Thus ΔY/Δr m. Δr

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(1 - k)

= ( - ) /( + ) = ( - )