**Computing near bed concentration for deposition**

**(Page 260 Julien's book; Page 114 Garcia's book; Guo and Julien, 2004)**

: depth averaged volume suspended sediment concentration (Known from STM)

: is concentration near the bed (b = 0.05H) which we are seeking for

: First Einstein Integral (Einstein 1950) which is defined:

(1)

where b is a location just above the bed (b = 0.05H = δb H or 2ds/H) or Relative bed layer thickness

H is water column depth

: Rouse dimensionless number (Ro> 2.5~2: bed load, 2.5~2-1.2 : 50% suspension, 1.2-0.8: 100% suspension, and Ro<0.8 wash load)

in the J1 denominator is known value so (1) could be rework as:

Here after I do not sure if the stuff is the same, I have to compare the Numbers:

So we need to solve

Keep in mind the Ro is less than 2 in suspended load for detail of derivation see (Guo and Julien, 2004; Gu0, 2002)

The (A) has a closed form solution for integer values of Ro but for real value

For :

the last term on the right hand side could be trimmed after 5 terms

Ro at must could be assumed 2 for suspended load so if just use the first 6 terms, k=6 then K-Ro=4, the trimmed terms are of an order of:

**Computational Control for consistency with MATLAB**

function [I\_1\_G,I\_1\_J]=I\_one\_garcia(Z)

% this fucntion just working for the delta = 0.05

C0 = 1.1038;

C1 = 2.6626;

C2 = 5.6497;

C3 = 0.3822;

C4 = -0.6174;

C5 = 0.1315;

C6 = -0.0091;

I\_1\_G = 1/(C0 + C1\*Z + C2\*(Z^2) + C3\*(Z^3) + C4\*(Z^4) + C5\*(Z^5)+ C6\*(Z^6));

% Numerical with Guo Julien

E = 0.05;

I\_1\_J = Z\*pi/sin(Z\*pi) - ((1-E)^Z)/(E^(Z-1))...

- Z\*(((E/(1-E))^(1-Z))/(1-Z))...

+ Z\*(((E/(1-E))^(2-Z))/(1-Z))...

- Z\*(((E/(1-E))^(3-Z))/(1-Z))...

+ Z\*(((E/(1-E))^(4-Z))/(1-Z))...

- Z\*(((E/(1-E))^(5-Z))/(1-Z))...

+ Z\*(((E/(1-E))^(6-Z))/(1-Z))...

- Z\*(((E/(1-E))^(7-Z))/(1-Z))...

+ Z\*(((E/(1-E))^(8-Z))/(1-Z));

% this is an analytical solution

% ref\_value\_z\_equal\_3 = -3\*log(E)+1/(2\*E^2)-(3/E)+(3/2) + E

I\_1\_J = I\_1\_J\* E^(Z)/((1-E)^Z);

return