

My Private FLAC3D Repository



Kyeong Sun Kim

Civil and Environmental Engineering

Seoul National University

Sept, 2021

Contents

1	Working with FISH in FLAC3D	1
2	Using Python with FLAC3D	2
2.1	Geometry, Grid, Zone	2
2.2	Group, Range	4
2.3	Constitutive Model	4
2.4	B.C. and I.C.	4
2.5	Step to Equilibrium	4
2.6	Support, Structure, Restore	4
2.7	Plot	4
3	Illustrative Model – Mechanics of FLAC3D	5
3.1	Geometry, Grid, Zone	6
3.2	Group, Range	6
3.3	Constitutive Model	6
3.4	B.C. and I.C.	6
3.5	Step to Equilibrium	6
3.6	Support, Structure, Restore	6
3.7	Plot	6
4	Axial and Lateral Loading of a Concrete Pile	7
4.1	Geometry, Grid, Zone	8
4.2	Group, Range	8
4.3	Constitutive Model	8
4.4	B.C. and I.C.	8
4.5	Step to Equilibrium	8
4.6	Support, Structure, Restore	8
4.7	Plot	8

5	Smooth Circular Footing on an Associated Mohr-Coulomb Material	9
5.1	Geometry, Grid, Zone	10
5.2	Group, Range	10
5.3	Constitutive Model	10
5.4	B.C. and I.C.	10
5.5	Step to Equilibrium	10
5.6	Support, Structure, Restore	10
5.7	Plot	10

1

Working with **FISH** in **FLAC3D**

2

Using Python with FLAC3D

Contents

2.1	Geometry, Grid, Zone	2
2.2	Group, Range	4
2.3	Constitutive Model	4
2.4	B.C. and I.C.	4
2.5	Step to Equilibrium	4
2.6	Support, Structure, Restore	4
2.7	Plot	4

2.1 Geometry, Grid, Zone

The `itasca` module defines functions and classes for interaction between `Python` and `FLAC3D`.

2. Using Python with FLAC3D

```
"""  
  
import itasca as it  
it.command("python-reset-state false")  
"""
```

The `it.command` function is used to issue a series of FLAC3D commands.

The `it.zone.count` function creates 1000 zones

```
"""  
  
it.zone.count() # outputs 1000  
"""
```

The `it.zone.find(1)` returns a Zone object with id 1. The object is assigned to the Python variable `z`.

```
"""  
  
z = it.zone.find(1)  
print z # outputs <itasca.zone.Zone object at 0x00000001B388600, ID : 1>  
z.pos() # outputs vec3(( 5.00000e-01, 5.00000e-01, 5.00000e-01))  
"""
```

The variable `z` is a Zone object (FLAC3D zone)

`pos` method of this object returns the zone centroid.

`for` statement is used to iterate over sequences of things, Loop over all FLAC3D zones.

```
"""  
  
volume_sum = 0.0  
for z in it.zone.list():  
    volume_sum += z.vol()  
"""
```

Check that the sum of the zone volumes is what we expect.

2. Using Python with FLAC3D

```
"""  
  
print volume_sum # outputs 1000.0  
print z.vol() * it.zone.count()  
assert volume_sum == z.vol() * it.zone.count() # outputs 1000.0  
"""
```

Let's find a zone near the center of the model

```
"""  
  
z = it.zone.near ((5,5,5))  
#confirm position with pos method  
z.pos() # outputs vec3(( 4.500000e+00, 4.500000e+00, 4.500000e+00))  
"""
```

2.2 Group, Range

```
"""  
  
"""
```

2.3 Constitutive Model

2.4 B.C. and I.C.

2.5 Step to Equilibrium

2.6 Support, Structure, Restore

2.7 Plot

3

Illustrative Model – Mechanics of **FLAC3D**

Contents

3.1	Geometry, Grid, Zone	6
3.2	Group, Range	6
3.3	Constitutive Model	6
3.4	B.C. and I.C.	6
3.5	Step to Equilibrium	6
3.6	Support, Structure, Restore	6
3.7	Plot	6

3. Illustrative Model – Mechanics of FLAC3D

3.1 Geometry, Grid, Zone

3.2 Group, Range

3.3 Constitutive Model

3.4 B.C. and I.C.

3.5 Step to Equilibrium

3.6 Support, Structure, Restore

3.7 Plot

4

Axial and Lateral Loading of a Concrete Pile

Contents

4.1	Geometry, Grid, Zone	8
4.2	Group, Range	8
4.3	Constitutive Model	8
4.4	B.C. and I.C.	8
4.5	Step to Equilibrium	8
4.6	Support, Structure, Restore	8
4.7	Plot	8

4. Axial and Lateral Loading of a Concrete Pile

4.1 Geometry, Grid, Zone

4.2 Group, Range

4.3 Constitutive Model

4.4 B.C. and I.C.

4.5 Step to Equilibrium

4.6 Support, Structure, Restore

4.7 Plot

5

Smooth Circular Footing on an Associated Mohr-Coulomb Material

Contents

5.1	Geometry, Grid, Zone	10
5.2	Group, Range	10
5.3	Constitutive Model	10
5.4	B.C. and I.C.	10
5.5	Step to Equilibrium	10
5.6	Support, Structure, Restore	10
5.7	Plot	10

5. Smooth Circular Footing on an Associated Mohr-Coulomb Material

5.1 Geometry, Grid, Zone

5.2 Group, Range

5.3 Constitutive Model

5.4 B.C. and I.C.

5.5 Step to Equilibrium

5.6 Support, Structure, Restore

5.7 Plot