T2FL Implementation:Mendel, Jerry M., and RI Bob John. "Type-2 fuzzy sets made simple." IEEE Transactions on fuzzy systems 10.2 (2002): 117-127.

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Abstract

1 Type-2 fuzzy set definition

```
from type2fuzzy import GeneralType2FuzzySet

'''
Example 1 : definition of the general type-2 fuzzy set
'''

gt2fs_rep =    ''' (0.9/0 + 0.8/0.2+ 0.7/0.4 + 0.6/0.6 + 0.5/0.8)/1
+(0.5/0 + 0.35/0.2 + 0.35/0.4 + 0.2/0.6 + 0.5/0.8)/2
+(0.35/0.6 + 0.35/0.8)/3
+(0.1/0 + 0.35/0.2 + 0.5/0.4 + 0.1/0.6 + 0.35/0.8)/4
+(0.35/0 + 0.5/0.2 + 0.1/0.4 + 0.2/0.6 + 0.2/0.8)/5'''

# create set
print('\nSet_representation:')
gt2fs = GeneralType2FuzzySet.from_representation(gt2fs_rep)
print(gt2fs)
```

```
Set representation: (0.9000 / 0.0000 + 0.8000 / 0.2000 + 0.7000 / 0.4000 +
0.6000 / 0.6000 + 0.5000 / 0.8000) / 1.0000
+ (0.5000 / 0.0000 + 0.3500 / 0.2000 + 0.3500 / 0.4000 +
0.2000 / 0.6000 + 0.5000 / 0.8000) / 2.0000
+ (0.3500 / 0.6000 + 0.3500 / 0.8000) / 3.0000 + (0.1000 / 0.0000
+ 0.3500 / 0.2000 + 0.5000 / 0.4000 +
0.1000 / 0.6000 + 0.3500 / 0.8000) / 4.0000 +
(0.3500 / 0.0000 + 0.5000 / 0.2000 + 0.1000 / 0.4000 +
0.2000 / 0.6000 + 0.2000 / 0.8000) / 5.0000
```

2 Verticalk Slice

```
# different ways to get vertical slice
print('mu_a_tilde(',1,')= ', gt2fs.vertical_slice(1))
print('mu_a_tilde(',2,')= ', gt2fs[2])
print('mu_a_tilde(',3,')= ', gt2fs.vertical_slice(3))
print('mu_a_tilde(',4,')= ', gt2fs[4])
```

```
mu( 1 )=
0.900/0.000 + 0.800/0.200 + 0.700/0.400 + 0.600/0.600 + 0.500/0.800
mu( 2 )=
0.500/0.000 + 0.350/0.200 + 0.350/0.400 + 0.200/0.600 + 0.500/0.800
mu( 3 )=
0.350/0.600 + 0.350/0.800
mu( 4 )=
0.100/0.000 + 0.350/0.200 + 0.500/0.400 + 0.100/0.600 + 0.350/0.800
```