program_list

June 23, 2018

1

: - **Python 3.5 - Ubuntu 16.04 - PyCharm 2017.3 - Jupyter Notebook**

```
program
 README.md
 setup.py
 examples
 udntools
```

README.md	-	
setup.py	-	Python
udntools	d	
examples	d	

- "udntools" - "examples" "udntools"
"udntools" "examples"

1.1 "udntools"

"udntools"

```
udntools
 bs
 channel
 __init__.py
 region
 ue
 utils
```

bs	d

ue	d
channel	d
region	d
utils	d

5

1.1.1 "bs"

"bs"

```
bs
 base_bs.py
 __init__.py
```

- BaseBS
  - Inherit from class **Object**

bs_number_
bs_power_
bs_distribution_
bs_position_
set_bs_to_region
select_ue

1.1.2 "ue"

"ue"

```
ue
 base_ue.py
 __init__.py
```

- BaseUE
  - Inherit from class **Object**

ue_number_

ue_distribution_
bs_position_
set_ue_to_region

1.1.3 "Channel"

"channel"

```
channel
 __init__.py
 large_fade_channel.py
 small_fade_channel.py
```

- LargeFadeChannel
  - Inherit from class **Object**

path_loss_factor_
large_fade_factor_matrix

- SmallFadeChannel
  - Inherit from class **Object**

small_fade_
h_matrix_
generate_h_matrix

1.1.4 "Region"

"region"

```
region
 base_region.py
 comp_service_region.py
 __init__.py
 service_region.py
```

- BaseRegion
  - Inherit from class **Object**

x_min	
x_max	
y_min	
y_max	
ground_position_	
get_ground	

- ServiceRegion
  - Inherit from class **BaseRegion, BaseBS, BaseUE**

bs_ue_dict_	
kill_ue	
set_bs_to_region	
set_ue_to_region	
set_ue_sigma	
set_ue_distribution	
select_ue	bs_ue_dict_

- CompServiceRegion
  - Inherit from class **ServiceRegion, LargeFadeChannel, SmallFadeChannel**

cluster_set_		
cluster_bs_position_		
cluster_ue_set_		
cluster_ue_position_		
self.sir_array		
cluster_by_kmeans	Kmeans	
cluster_by_dfs		
get_cluster_ue_position	cluster_ue_set_	cluster_ue_position_
zfbf_equal_allocation	ZFBF	
sir_array_sim		

1.1.5 "utils"

"utils"

```
utils
 ase_theory.py
 cdf.py
 dfs_dict_by_distance.py
 dim2_distance.py
 __init__.py
 pc_theory.py
```

ase_theory.py	-
cdf.py	-
dfs_dict_by_distance.py	-
dim2_distance.py	-
pc_theory.py	-

2

"examples" examples

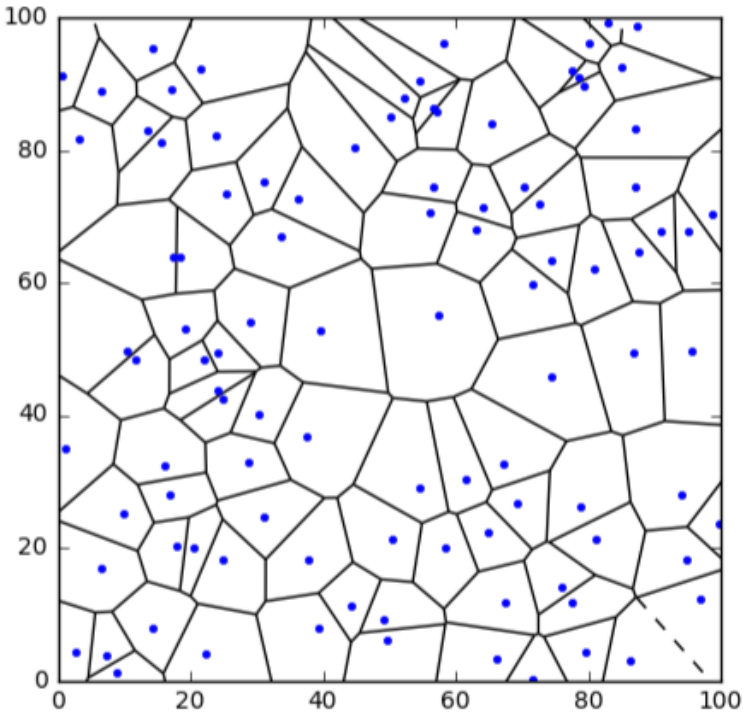
```
examples
 ase_sim
 capacity_map
 clustering_precoding
 dfs_clustering
 kmeans_clustering
 pc_sim
```

ase_sim	
capacity_map	
clustering_precoding	
dfs_clustering	
kmeans_clustering	k -
pc_sim	

2.1

-
  - examples/capacity_map
- **3-3**

- **Step 0**
- **Step 1**
- **Step 2** Voronoi



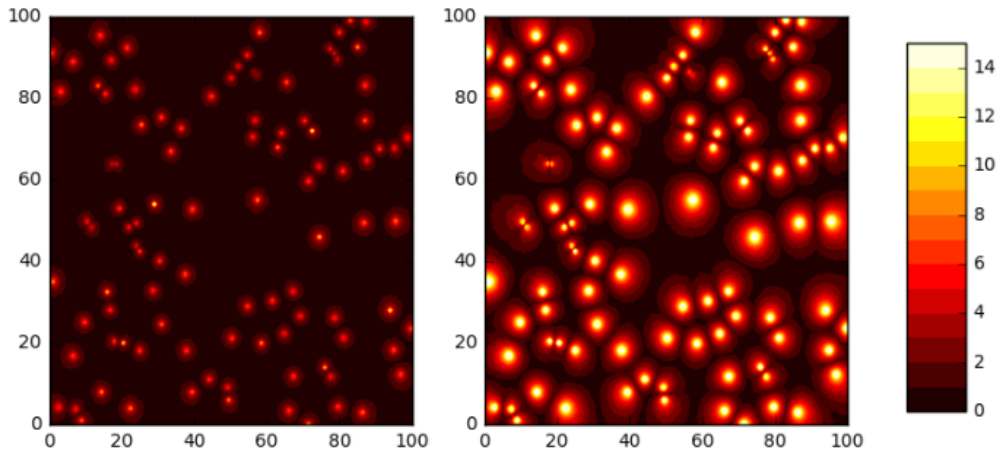
2.2

-
  - examples/capacity_map
- **3-4**

- **Step 0** 2.04.0 - **Step 1** ground_position_ - **Step 2**

2.3

-
  - examples/pc_sim
- **3-5 3-6 3-7**



capacity_hotmap

$$P_c(T,\lambda,\alpha,\sigma) = \frac{1}{1+\rho(T,\alpha)} + \frac{\rho(T,\alpha)}{1+\rho(T,\alpha)} \cdot \frac{1}{2\pi\sigma^2\lambda(1+\rho(T,\alpha))+1} \tag{1}$$

$$\rho(T,\alpha) = T^{2/\alpha} \int_{T^{-2/\alpha}}^{\infty} \frac{1}{1+u^{\alpha/2}}\,\mathrm{d}u \tag{2}$$

$P_c T\ \lambda\ \alpha\ \sigma$

- Step 0 3-5 3-6 3-7 - Step 1 - Step 2 - Step 3

2.4

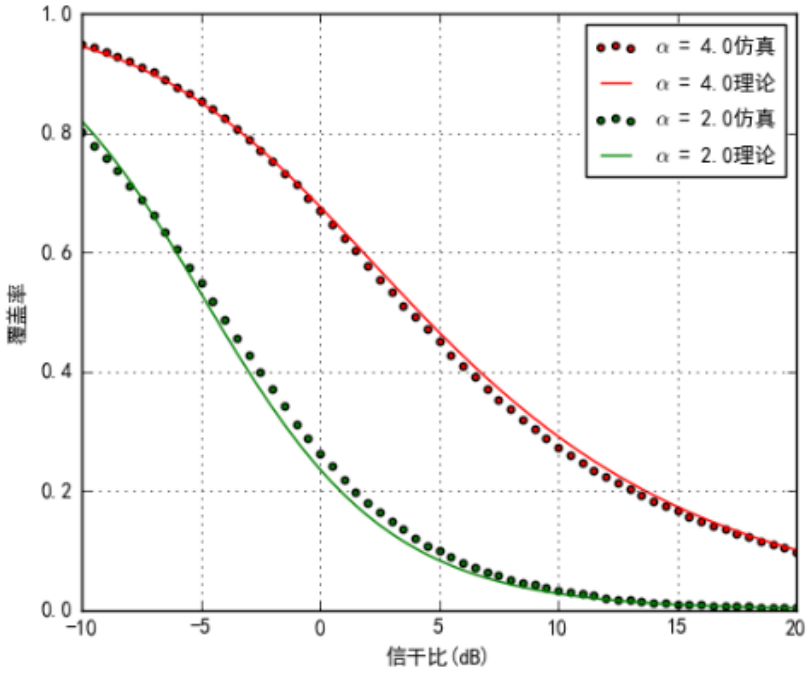
-
  - examples/ase_sim
- **3-8**

$$\eta_{ASE} = \lambda_s \int_{t>0} \frac{1}{1+\rho(2^t-1,\alpha)} + \frac{\rho(2^t-1,\alpha)}{1+\rho(2^t-1,\alpha)} \cdot \frac{1}{2\pi\sigma^2\lambda(1+\rho(2^t-1,\alpha))+1}\,\mathrm{d}t \tag{3}$$

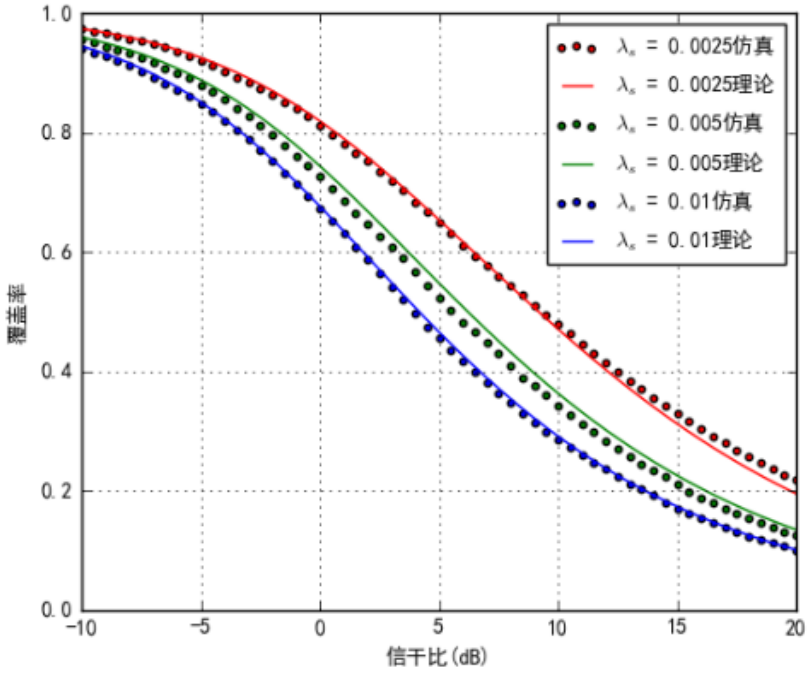
2.5

2.5.1

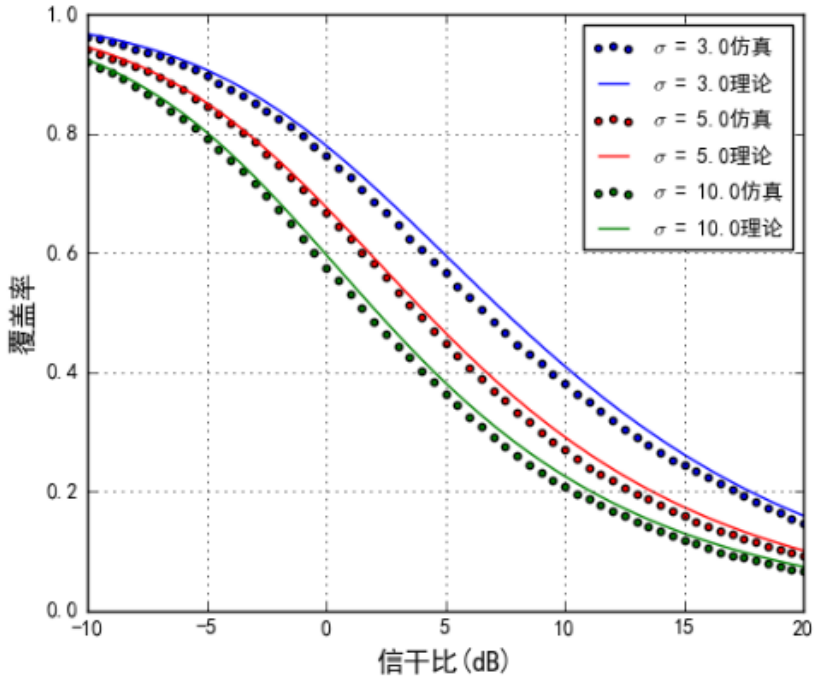
-



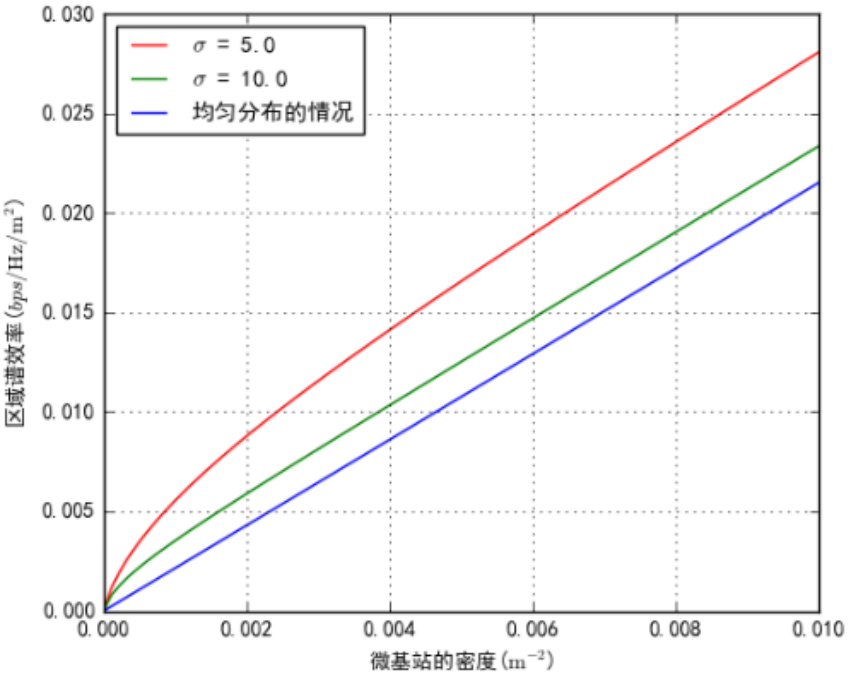
pc_alpha.png



pc_lambda_s.png



pc_sigma.png

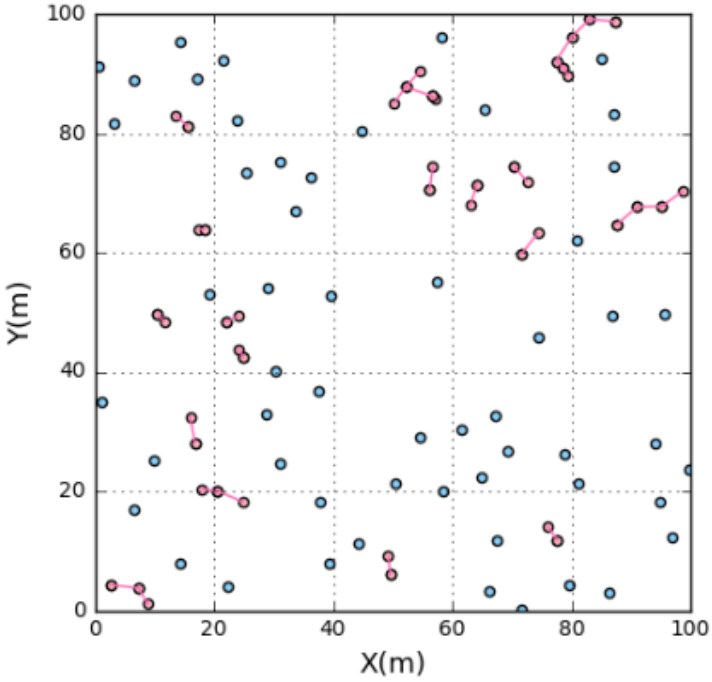


ase_sigma_lambda.png

– examples/dfs_clustering

- **4-3**

- **Step 0**
- **Step 1**
- **Step 2**



dfs_network_show.png

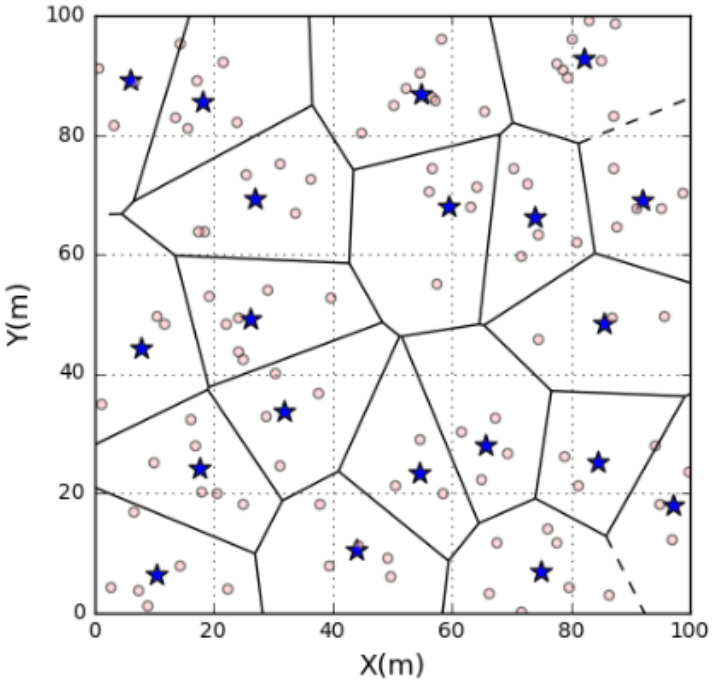
2.5.2 k -

-

– examples/dfs_clustering

- **4-4**

- **Step 0**
- **Step 1** k
- **Step 2**



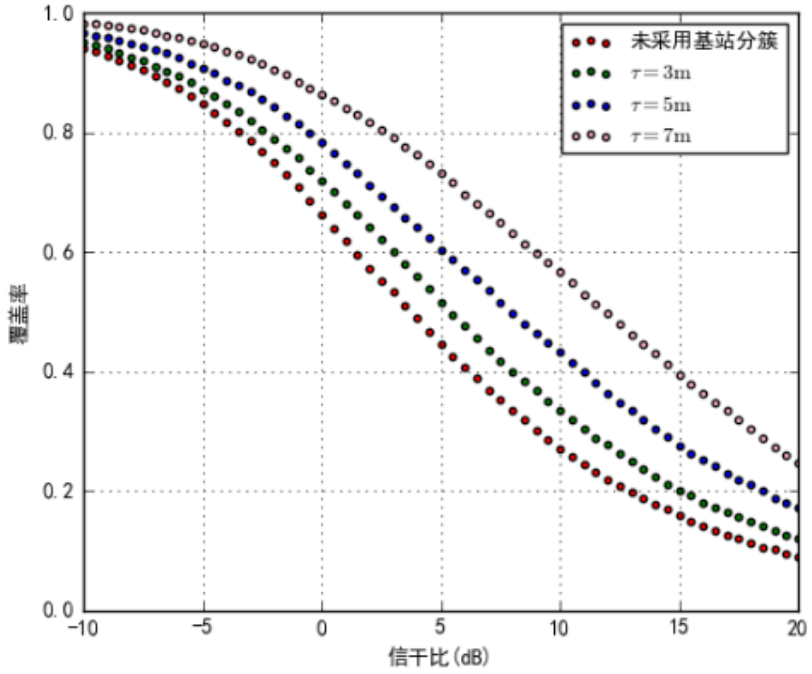
kmeans_network_show.png

2.6

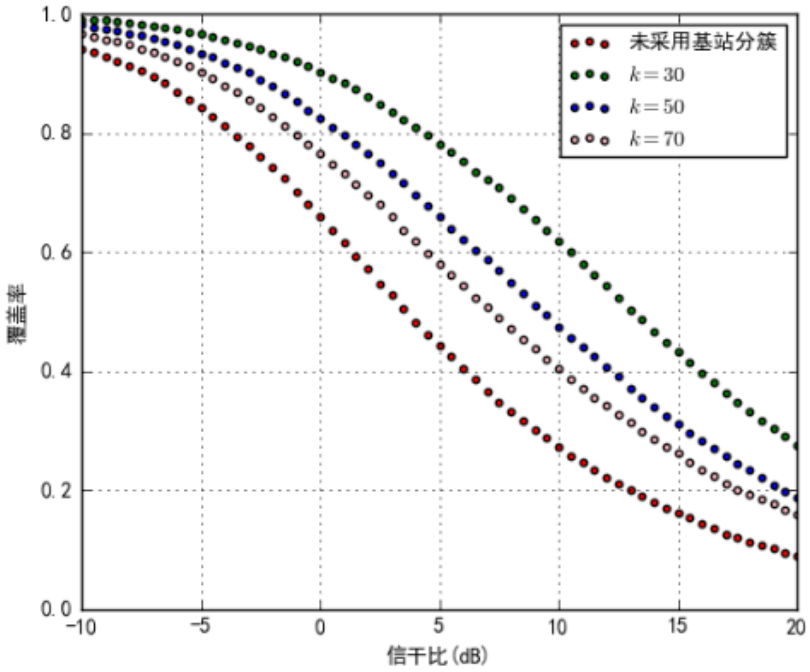
-
  - examples/clustering_precoding
- **4-5 4-6**

- **Step 0**
- **Step 1** **4-5** k - **4-6**
- **Step 2** ZFBF
- **Step 3**

k
.



pc_dfs_zfbf_show.png



pc_kmeans_zfbf_show.png