# Zápočtový program: „Prostorové databáze“

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**-- PŘÍPRAVA DAT:**

**-- pro jistotu smažu tabulku pozemky**
```
DROP TABLE pozemky;
```

**-- vytvořím tabulku „pozemky“**
```
CREATE TABLE pozemky
  (
    mkt_id NUMBER PRIMARY KEY,
    name   VARCHAR2(32),
    shape SDO_GEOMETRY
  );
```

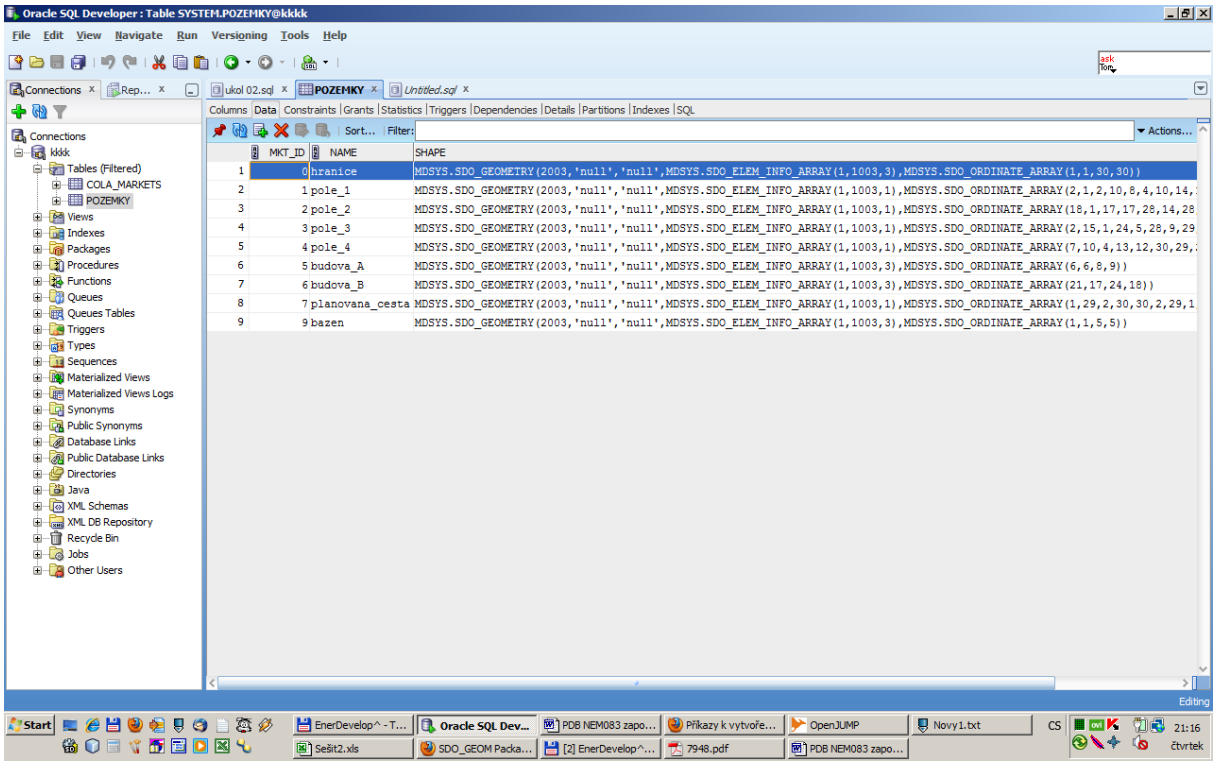
**-- mazání záznamů v pozemky**
```
DELETE FROM pozemky;
```

**-- vložení údajů**
**-- 1x hranice, 4x pole, 2x budova, 1x cesta, 1x bazén**
```
INSERT INTO pozemky VALUES
  (
    0,
    'hranice',
    SDO_GEOMETRY( 2003,
    NULL, NULL, SDO_ELEM_INFO_ARRAY(1,1003,3),
    SDO_ORDINATE_ARRAY(1,1, 30,30)
    )
  );
INSERT INTO pozemky VALUES
  (
    1,
    'pole_1',
    SDO_GEOMETRY( 2003,
    NULL, NULL, SDO_ELEM_INFO_ARRAY(1,1003,1),
    SDO_ORDINATE_ARRAY(2,1 , 2,10 , 8,4 , 10,14 , 14,14 , 14,1 , 2,1) )
  );
INSERT INTO pozemky VALUES
  (
    2,
    'pole_2',
    SDO_GEOMETRY( 2003,
    NULL, NULL, SDO_ELEM_INFO_ARRAY(1,1003,1),
    SDO_ORDINATE_ARRAY(18,1 , 17,17 , 28,14 , 28,1 , 18,1) )
  );
INSERT INTO pozemky VALUES
  (
    3,
    'pole_3',
    SDO_GEOMETRY( 2003,
    NULL, NULL, SDO_ELEM_INFO_ARRAY(1,1003,1),
    SDO_ORDINATE_ARRAY(2,15 , 1,24 , 5,28 , 9,29 , 2,15 ) )
  );
```

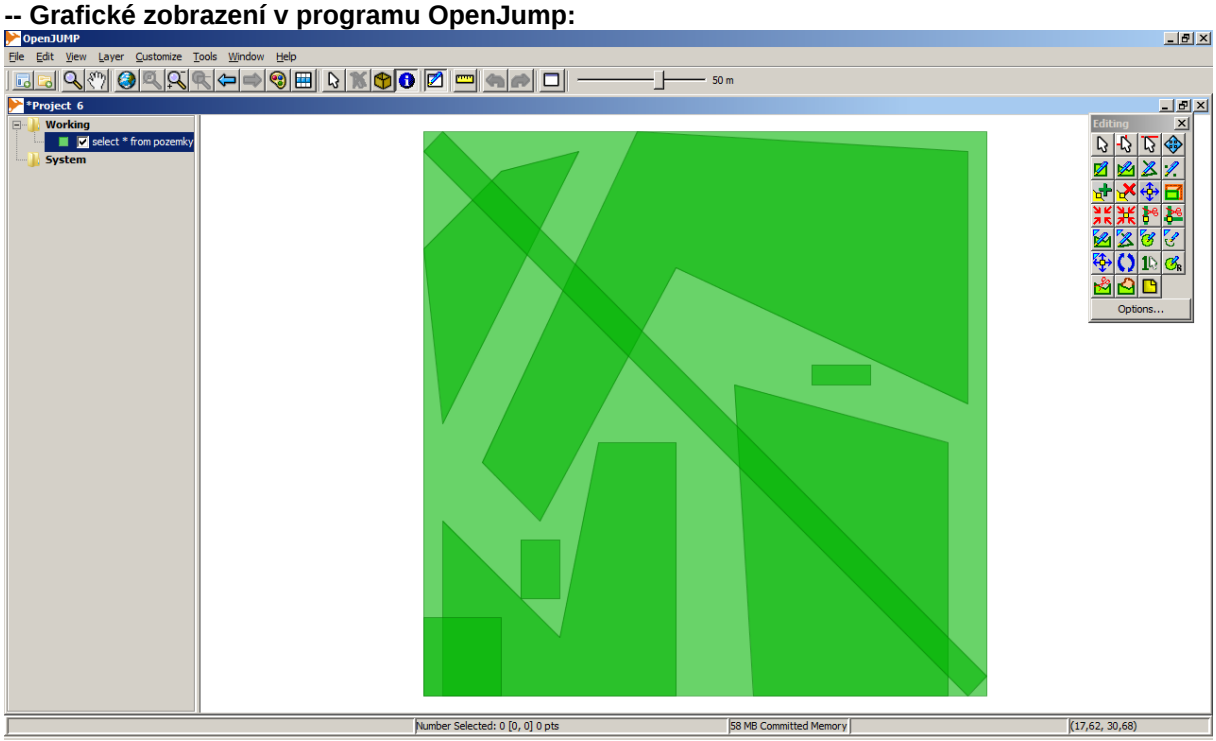
```
INSERT INTO pozemky VALUES
  (
    4,
    'pole_4',
    SDO_GEOMETRY( 2003,
    NULL, NULL, SDO_ELEM_INFO_ARRAY(1,1003,1),
    SDO_ORDINATE_ARRAY(7,10 , 4,13 , 12,30 , 29,29 , 29,16 , 14,23 , 7,10 )
)
  );

INSERT INTO pozemky VALUES
  (
    5,
    'budova_A',
    SDO_GEOMETRY( 2003,
    NULL, NULL, SDO_ELEM_INFO_ARRAY(1,1003,3),
    SDO_ORDINATE_ARRAY(6,6, 8,9)
    )
  );
INSERT INTO pozemky VALUES
  (
    6,
    'budova_B',
    SDO_GEOMETRY( 2003,
    NULL, NULL, SDO_ELEM_INFO_ARRAY(1,1003,3),
    SDO_ORDINATE_ARRAY(21,17, 24,18)
    )
  );
INSERT INTO pozemky VALUES
  (
    7,
    'planovana_cesta',
    SDO_GEOMETRY( 2003,
    NULL, NULL, SDO_ELEM_INFO_ARRAY(1,1003,1),
    SDO_ORDINATE_ARRAY(1,29 , 2,30 , 30,2 , 29,1 , 1,29)
    )
  );
INSERT INTO pozemky VALUES
  (
    8,
    'bazen',
    SDO_GEOMETRY( 2003,
    NULL, NULL, SDO_ELEM_INFO_ARRAY(1,1003,3),
    SDO_ORDINATE_ARRAY(1,1 , 5,5)
    )
  );
```

**--kontrola**

```
SELECT * FROM pozemky;
```




**-- Grafické zobrazení v programu OpenJump:**




**-- PROSTOROVÝ INDEX:**

**-- pro jistotu smažu záznam o gridu v tabulce user_sdo_geom_metadata**

```
DELETE FROM user_sdo_geom_metadata WHERE TABLE_NAME = 'POZEMKY';
```

**-- Vytvoření gridu před vytvořením prostorového indexu.**

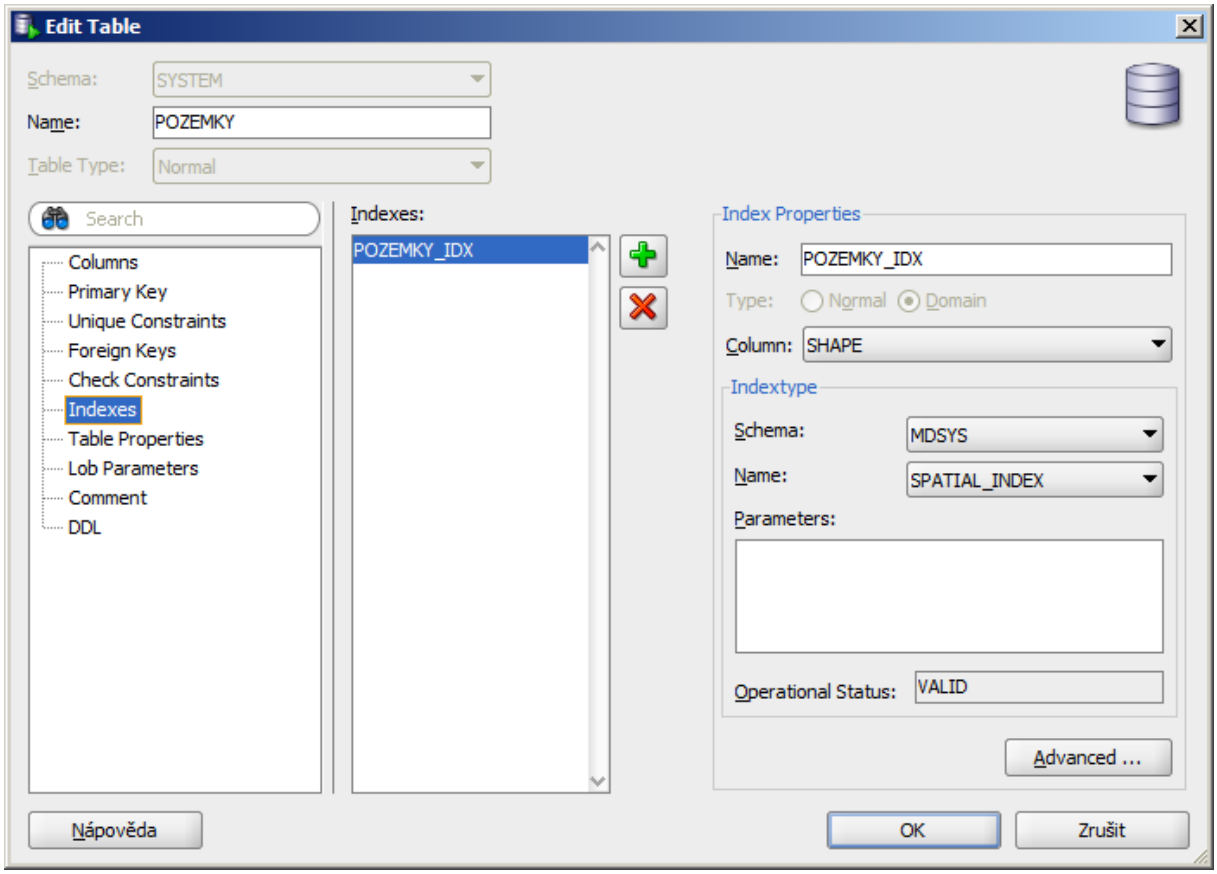
```
INSERT
INTO user_sdo_geom_metadata
```

```
  (
    TABLE_NAME,
    COLUMN_NAME,
    DIMINFO,
    SRID
  )
  VALUES
  (
    'pozemky',
    'shape',
    SDO_DIM_ARRAY(
      SDO_DIM_ELEMENT('X', 0, 30, 0.005),
      SDO_DIM_ELEMENT('Y', 0, 30, 0.005) ),
    NULL -- SRID
  );
```

**-- Vytvoření prostorového indexu:**

```
CREATE INDEX pozemky_idx ON pozemky (shape) INDEXTYPE IS
MDSYS.SPATIAL_INDEX;
```

**-- kontrola existence indexu:**

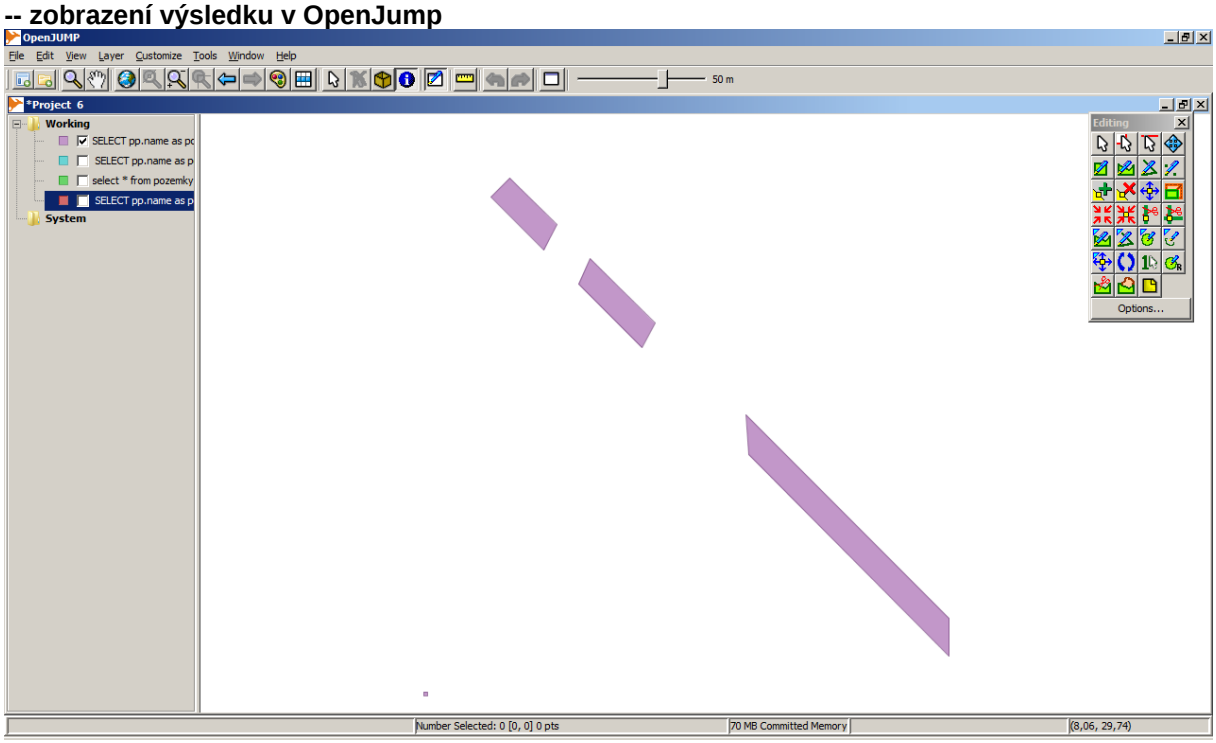


# -- ŘEŠENÍ VLASTNÍHO VYBRANÉHO PROBLÉMU

**-- 1.**
**-- o kolik pole přijde vlastník pozemku při stavbě cesty ?**
**-- hledám součet ploch, které vytvoří průnik polygonů polí a cesty**

**-- nalezení nových polygonů (průniků)**
```
SELECT pp.name as pole, pc.name as cesta,
SDO_GEOM.SDO_INTERSECTION(pp.shape,pc.shape,0.005)
  FROM pozemky pp, pozemky pc
  WHERE pp.name like 'pole_%' AND pc.name = 'planovana_cesta';
```

**-- zobrazení výsledku v OpenJump**




**-- plocha polí která bude zničena novou cestou:**
```
SELECT sum(plocha) znicena_plocha FROM
 (SELECT pp.name as pole, pc.name as cesta,
  SDO_GEOM.SDO_AREA(
    SDO_GEOM.SDO_INTERSECTION(pp.shape,pc.shape,0.005),
    0.005) AS plocha
  FROM pozemky pp, pozemky pc
  WHERE pp.name like 'pole_%' AND pc.name = 'planovana_cesta');
```

**-- výsledek:**
```
-- ZNICENA_PLOCHA
-- --------------------
-- 33,77333333333327
```

**-- 2.**
**-- vzdálenost mezi budovami**
```
 SELECT SDO_GEOM.SDO_DISTANCE(ba.shape, bb.shape, 0.005)
  FROM pozemky ba, pozemky bb
  WHERE ba.name = 'budova_A' AND bb.name = 'budova_B';
```

**-- výsledek:**

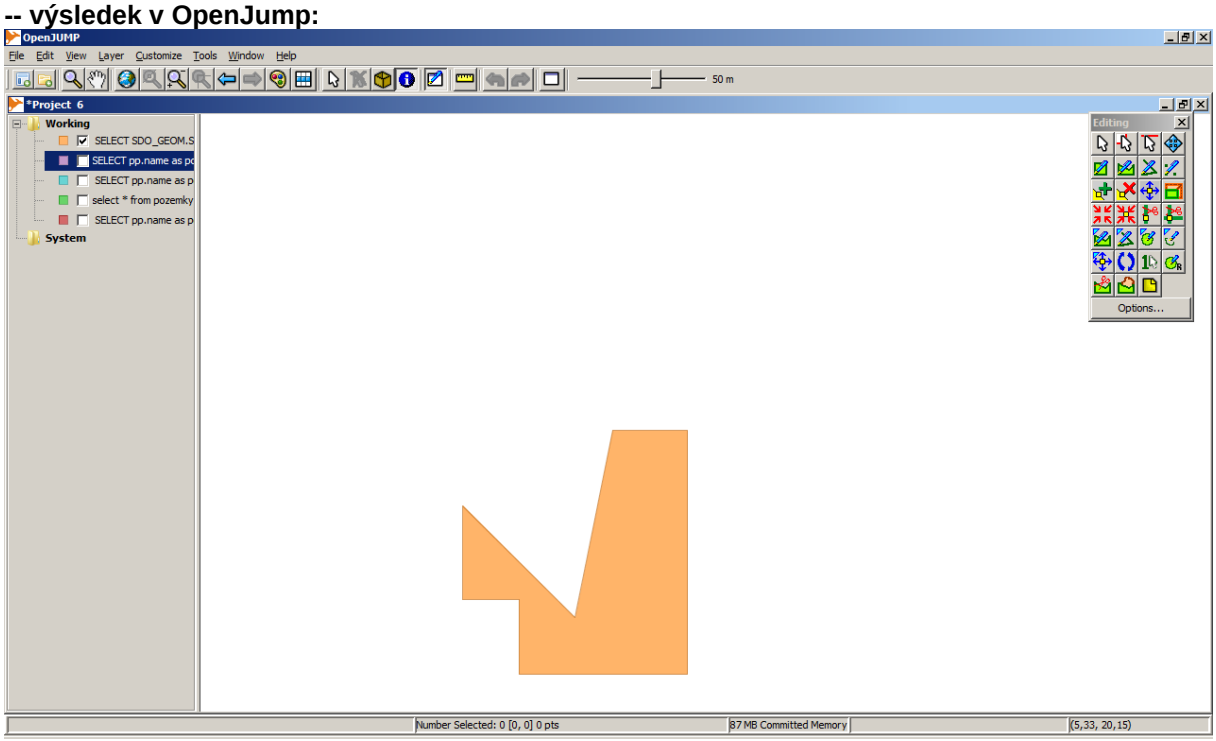
```
-- SDO_GEOM.SDO_DISTANCE(BA.SHAPE,BB.SHAPE,0.005)
-- ----------------------------------------------
-- 15,2643375224737
```

**-- 3.**

**-- vykopeme bazén v poli pole_4, zjistíme jak bude poté pole_4 vypadat**

```
 SELECT SDO_GEOM.SDO_DIFFERENCE(ba.shape, bb.shape, 0.005)
  FROM pozemky ba, pozemky bb
  WHERE ba.name = 'pole_1' AND bb.name = 'bazen';
```

**-- výsledek v OpenJump:**

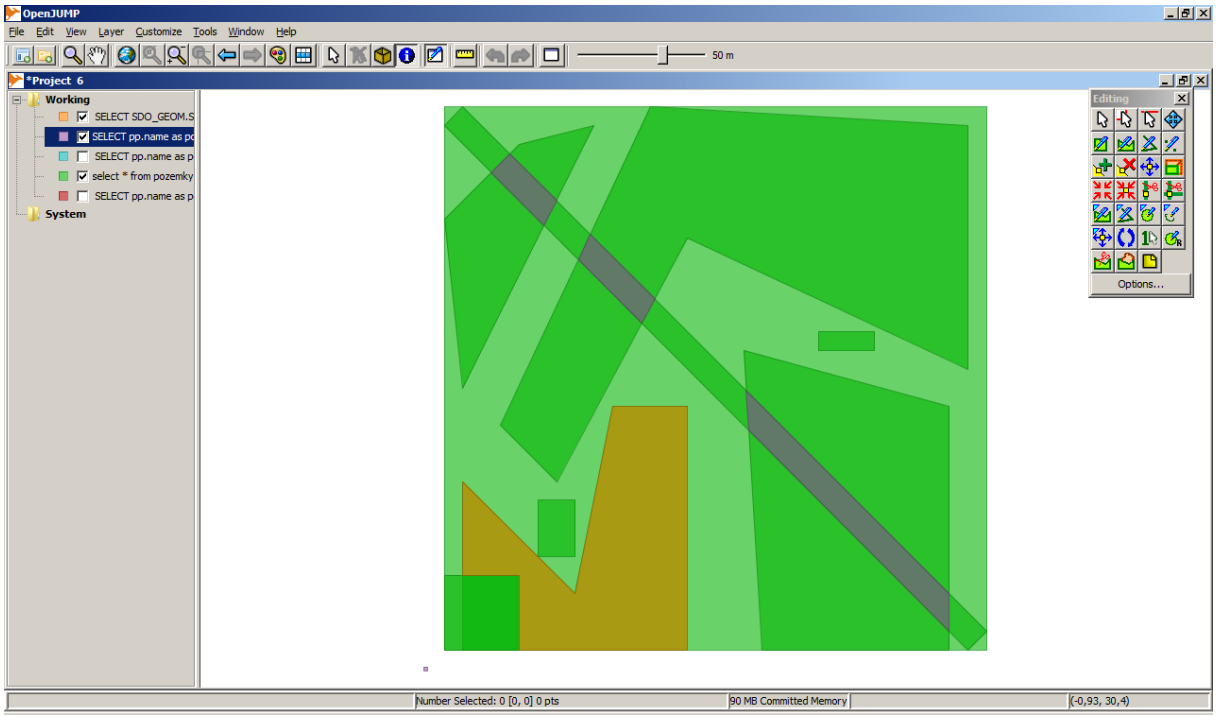



**-- Plocha pole_4 před vystavením bazénu = 104**

```
SELECT SDO_GEOM.SDO_AREA (pozemky.shape, 0.005) AS plochaPred
FROM pozemky WHERE pozemky.name = 'pole_1';
```

**-- Plocha pole_4 po vystavení bazénu = 92**

```
SELECT
SDO_GEOM.SDO_AREA
(
 (SELECT SDO_GEOM.SDO_DIFFERENCE(ba.shape, bb.shape, 0.005)
  FROM pozemky ba, pozemky bb
  WHERE ba.name = 'pole_1' AND bb.name = 'bazen')
 , 0.005
)
FROM pozemky WHERE pozemky.name = 'pole_1'
;
```


OpenJUMP
File Edit View Layer Customize Tools Window Help
50 m
*Project 6
Working
SELECT SDO_GEOM.S
SELECT pp.name as pc
SELECT pp.name as p
select * from pozemky
SELECT pp.name as p
System
Editing
Options...
Number Selected: 0 [0, 0] 0 pts
90 MB Committed Memory
(-0,93, 30,4)