Get UV from XY according to 2D Homography of a projective geometry transform

- Author: WANG Lei,USTB
- Link: https://github.com/shidafu/ViewConeCalibration.git
- Date:2016/3/3
- Algorithom:

Get [*UV*] By solving:

$$s\begin{bmatrix} u \\ v \\ 1 \end{bmatrix} = \begin{bmatrix} h_{11} & h_{12} & h_{13} \\ h_{21} & h_{22} & h_{23} \\ h_{31} & h_{32} & 1 \end{bmatrix} \begin{bmatrix} x \\ y \\ 1 \end{bmatrix}$$

- Inputs:

```
H----3 by 3 matrix: [h11 h12 h13;
                     h21 h22 h23;
                     h31 h32  1]
XY----cordNum by pointNum matrix,
             cordNum==2,pointNum>=4,
             [x1,x2,...;
              y1,y2,...]
```

- Outputs:

```
UV----cordNum by pointNum matrix,
             cordNum==2,pointNum>=4,
             [u1,u2,...;
              v1,v2,...]
```

```
function UV = GetUVFromXY(H,XY)
% Initial
[cordNum, pointNum]=size(XY);
if ~(cordNum==2 || cordNum==3)
    error('Input matrix size error!');
end
[hH, wH]=size(H);
if hH~=3 ||~(wH==3 || wH==4)
    error('Input matrix size error!');
end
if wH==4
    H=[H(:,1:2) H(:,4)];
end
XY1=ones(3,pointNum,'double');
XY1(1:2,:)=XY(1:2,:);
UV=zeros(2,pointNum,'double');
% Algorithm
```

```
UVu=H(1,:)*XY1./H(3,:)*XY1;
UV(:,1)=UVu;
UVv=H(2,:)*XY1./H(3,:)*XY1;
UV(:,2)=UVv;
```

```
Error using GetUVFromXY (line 37)
Not enough input arguments.
```

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