

## Documentation of the MATLAB function `covfunform.m`

The function's arguments and returned quantities are listed in the help section of the function which is reproduced below.

```
function C=covfunform(phi,m,p)
% given mxm polynomial with coefficients in phi forms coefficients of
% matrix covariance function C(z)=ph(z)*phi(z^-1)'
```

To be specific, the given quantity `phi` has elements `phi(i,j,k+1)` which are coefficients  $\phi_{ijk}$  for  $i, j = 1 \dots m$  and  $k = 0 \dots p$  of matrices  $\phi_k$ . The returned quantity `C` similarly has elements `C(i,j,k+1)` which are coefficients  $C_{ijk}$  for  $i, j = 1 \dots m$  and  $k = 0 \dots p$  of matrices  $C_k$ .

The function constructs the matrices:

$$C_k = \sum_{v=0}^{p-k} \phi_{k+v} \phi_v', \quad k = 0 \dots p$$

which are the coefficients for  $k = 0 \dots p$  of the generating function

$$C(z) = \phi(z) \phi(z)'$$

where

$$\phi(z) = \sum_{k=0}^p \phi_k z^k$$

and

$$C(z) = \sum_{k=-p}^p C_k z^k$$

taking  $C_k = C_{-k}$  for negative  $k$ .