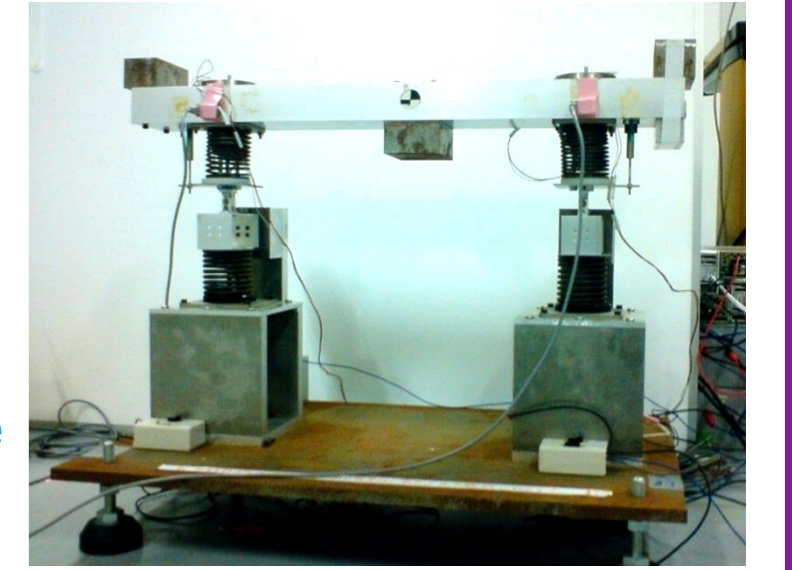
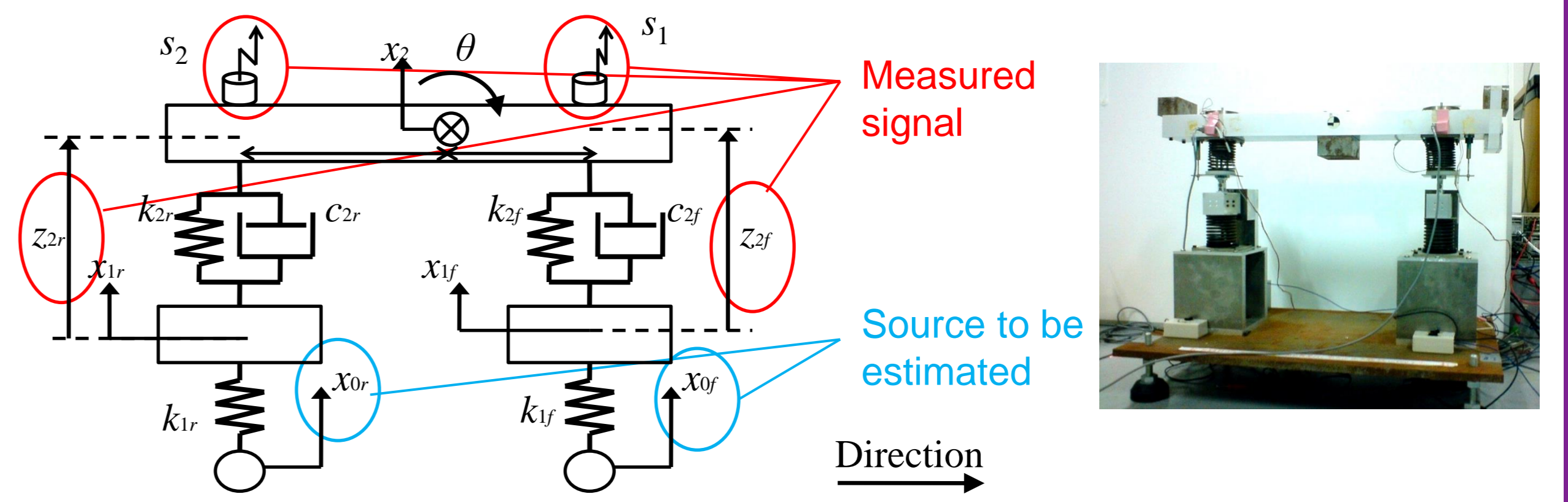
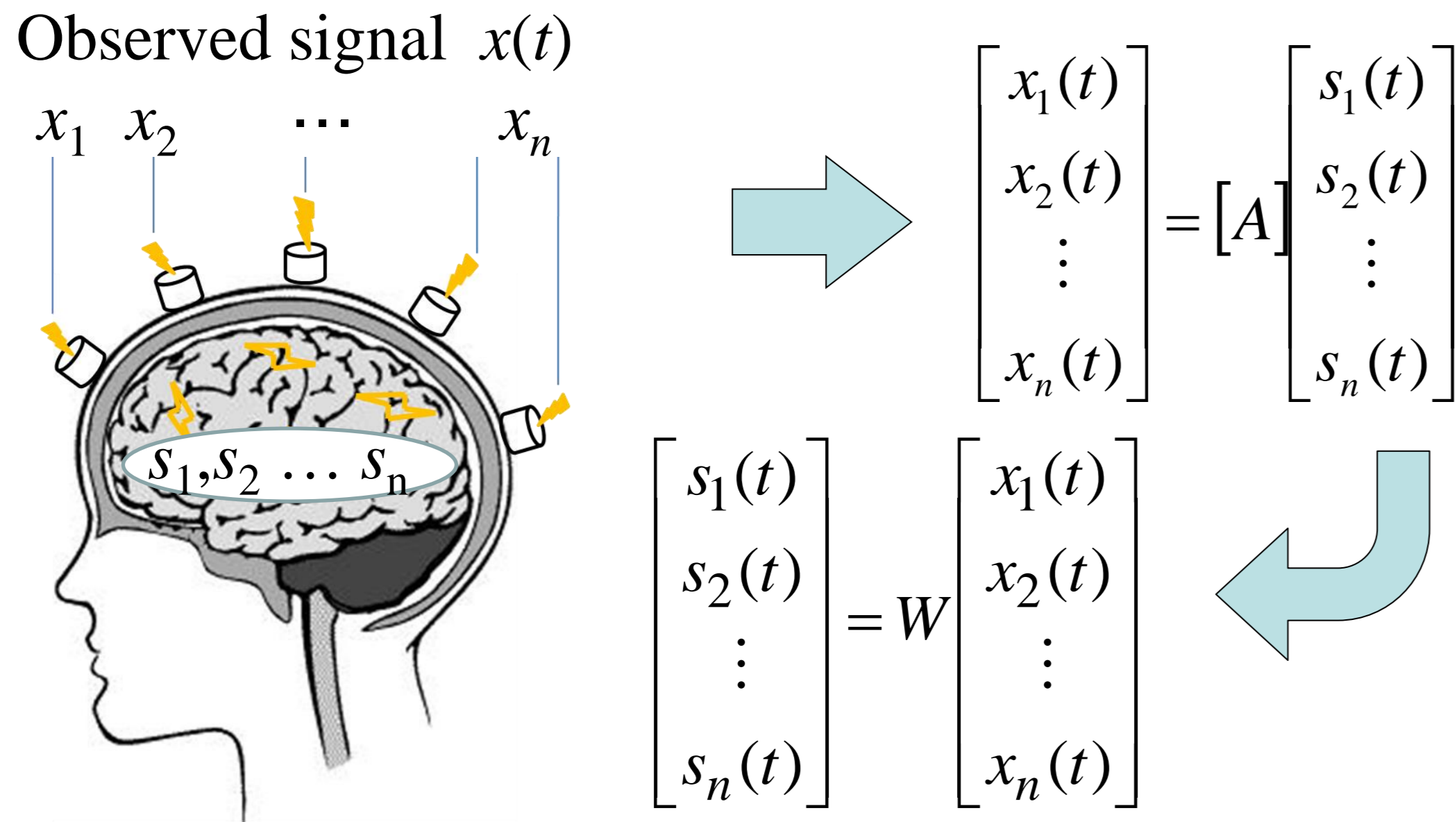


Independent component analysis Automobile model experiment



Kurtosis is maximized by iterations calculation.

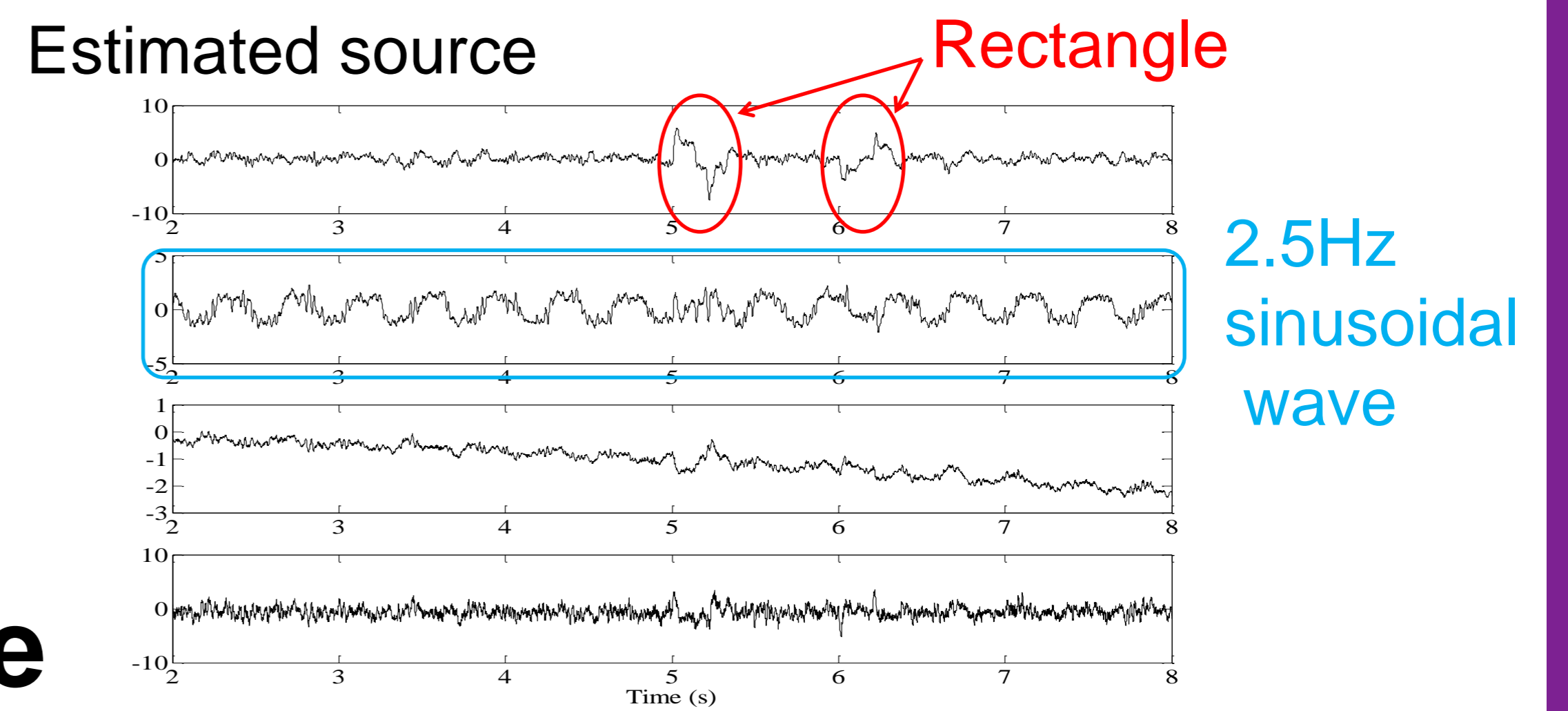
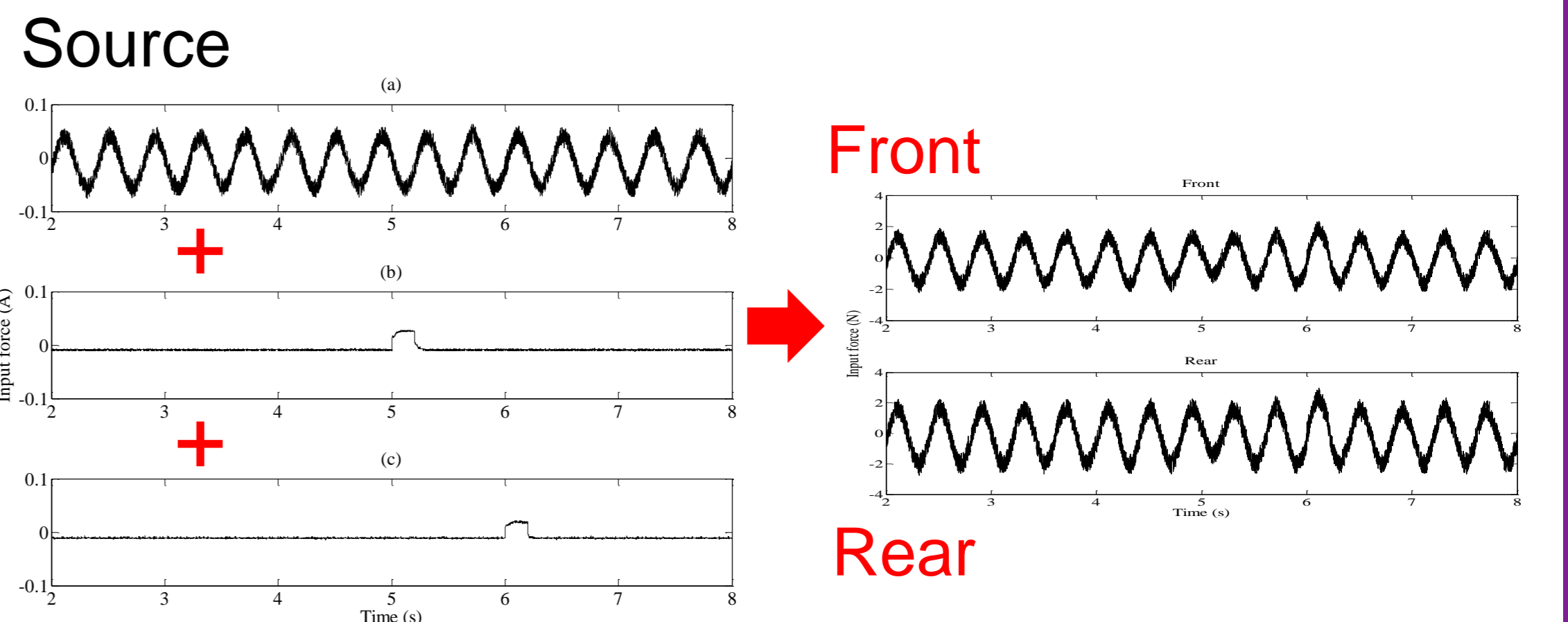
$$kurt(s) = E(s^4) - 3[E(s^2)]^2$$

Applications for dynamics

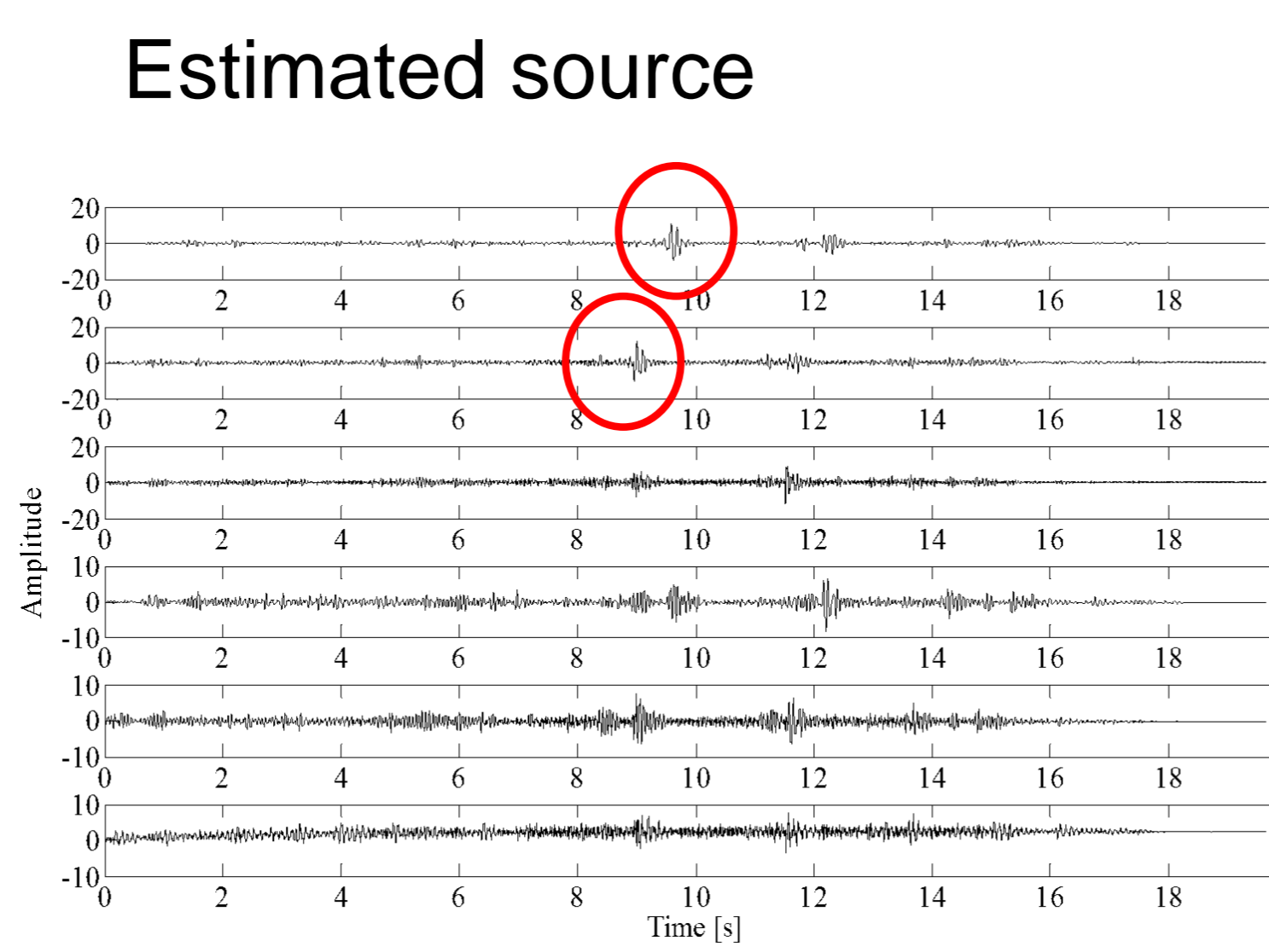
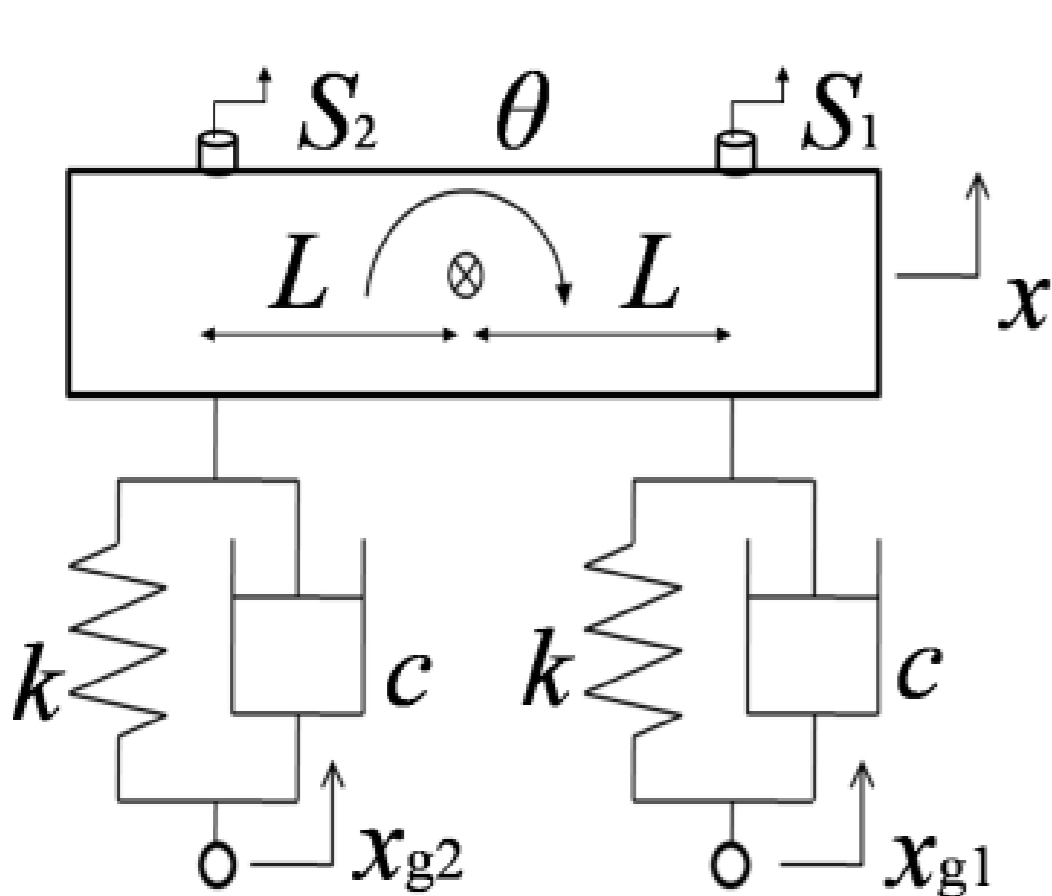
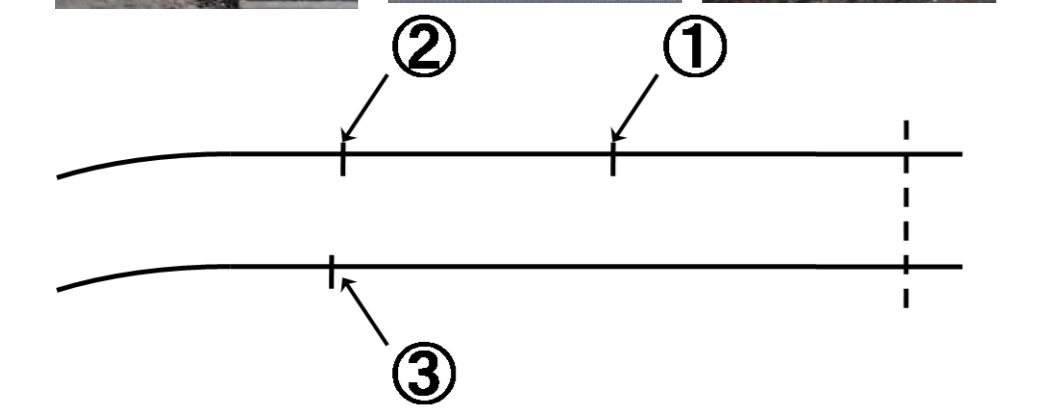
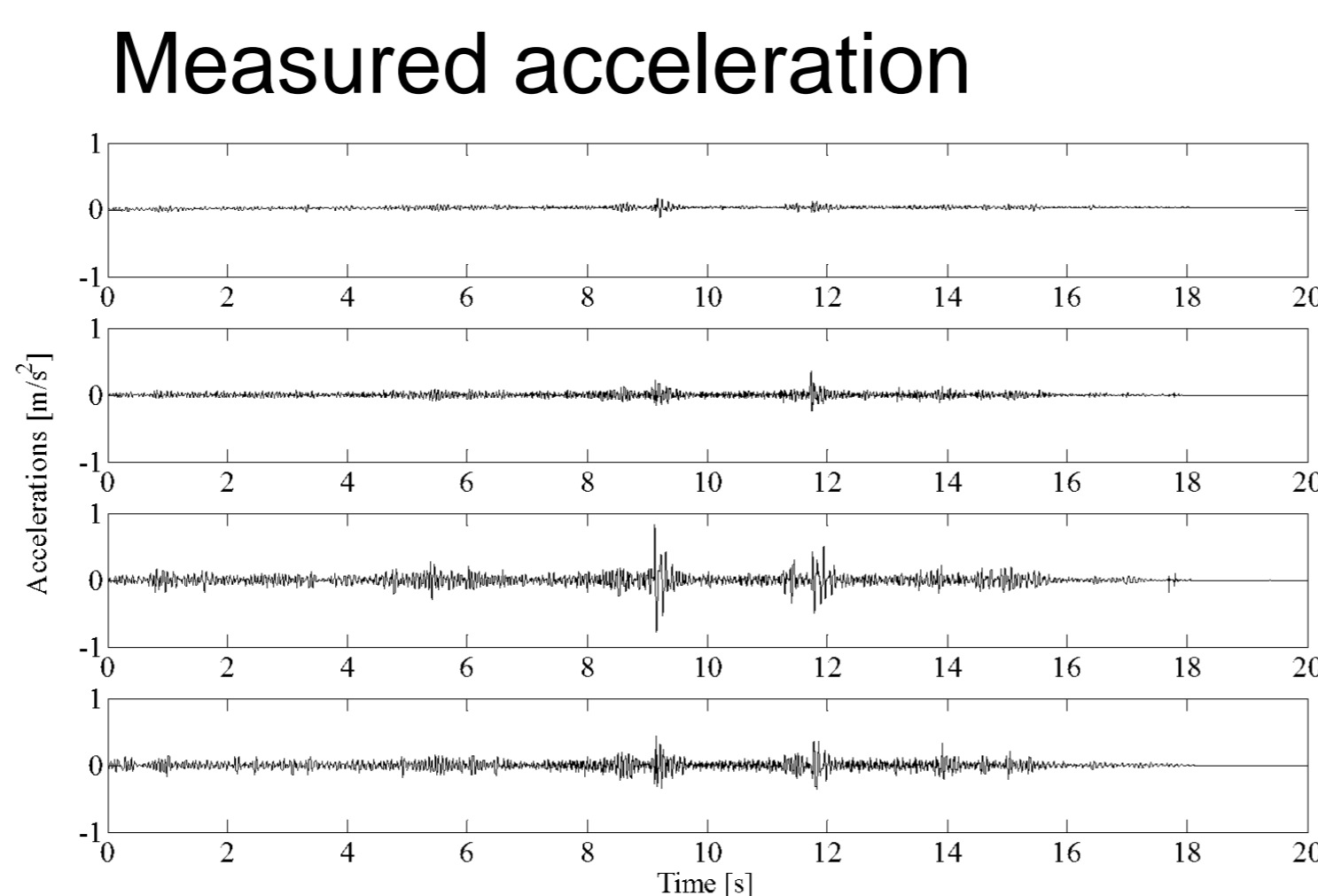
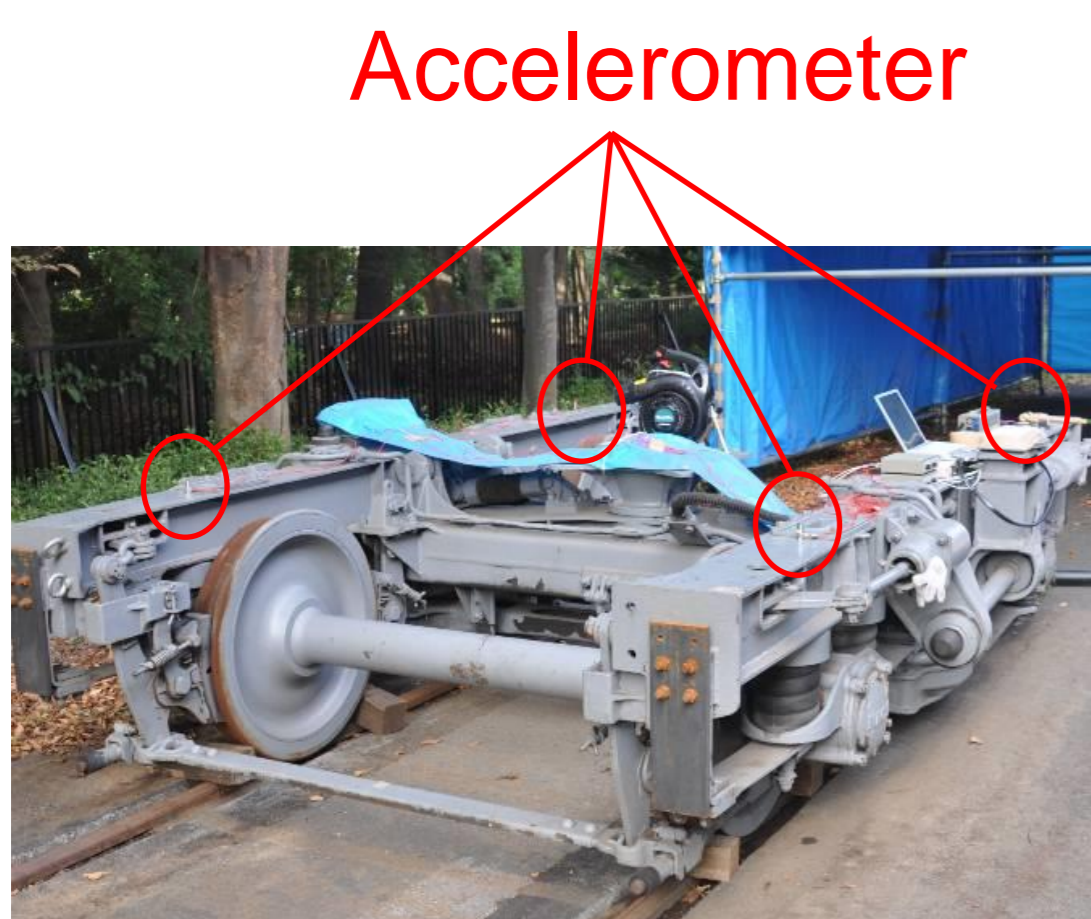
$$\begin{bmatrix} s_1(s) \\ s_2(s) \\ \vdots \\ s_n(s) \end{bmatrix} = \begin{bmatrix} W_{11}(s) & & \\ & \dots & \\ & & \dots \end{bmatrix} \begin{bmatrix} x_1(s) \\ x_2(s) \\ \vdots \\ x_n(s) \end{bmatrix}$$

$$\begin{bmatrix} s^1_1(t) \\ s^2_1(t) \\ s^3_1(t) \\ \vdots \\ s^2_n(t) \\ s^3_n(t) \end{bmatrix} = \begin{bmatrix} W^{11}_{11} & W^{12}_{11} & W^{13}_{11} \\ W^{21}_{11} & W^{22}_{11} & W^{23}_{11} \\ W^{31}_{11} & W^{32}_{11} & W^{33}_{11} \\ \vdots & \vdots & \vdots \end{bmatrix} \begin{bmatrix} \dot{x}_1(t) \\ x_1(t) \\ \int x_1(t) dt \\ \vdots \\ x_n(t) \\ \int x_n(t) dt \end{bmatrix}$$

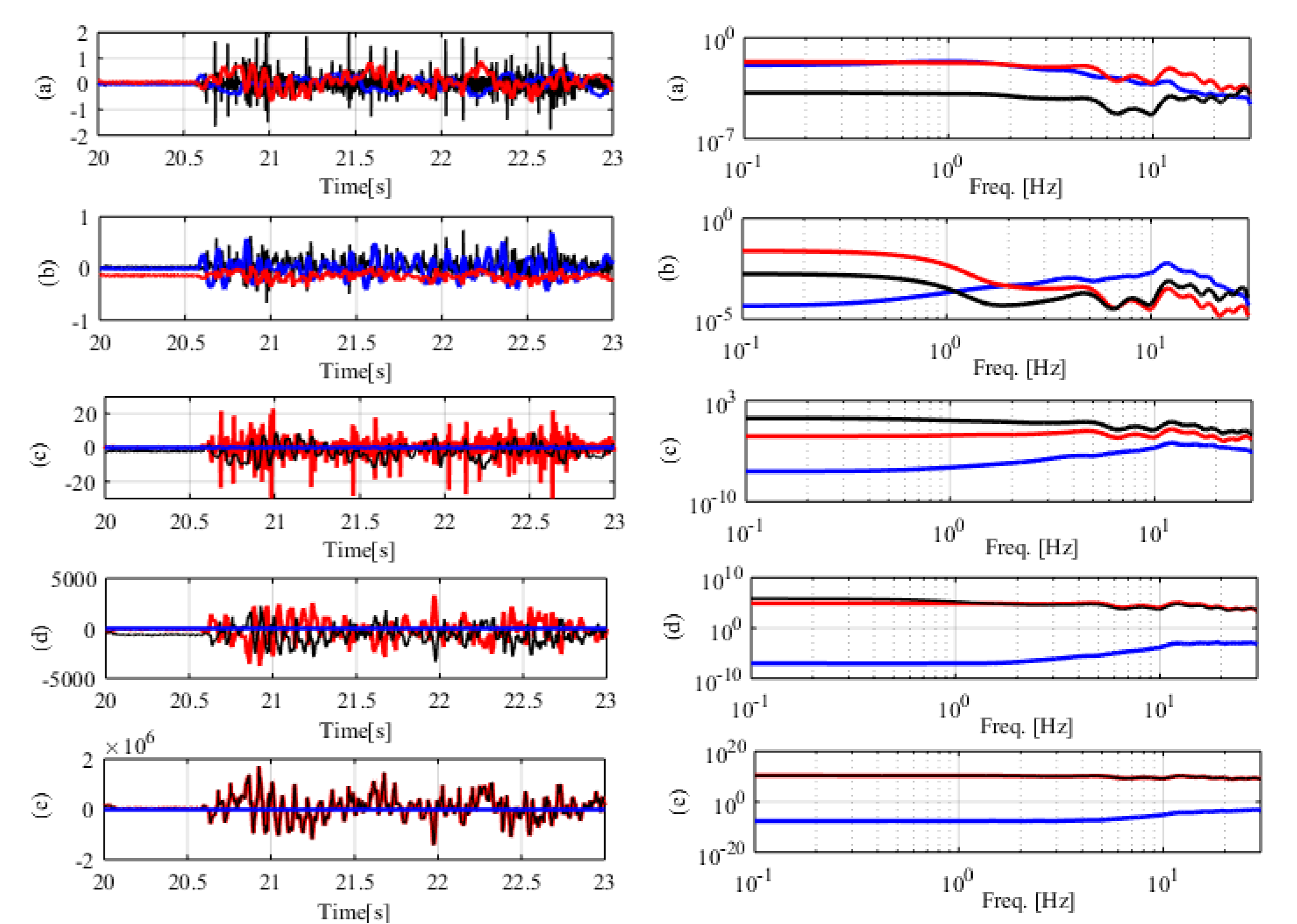
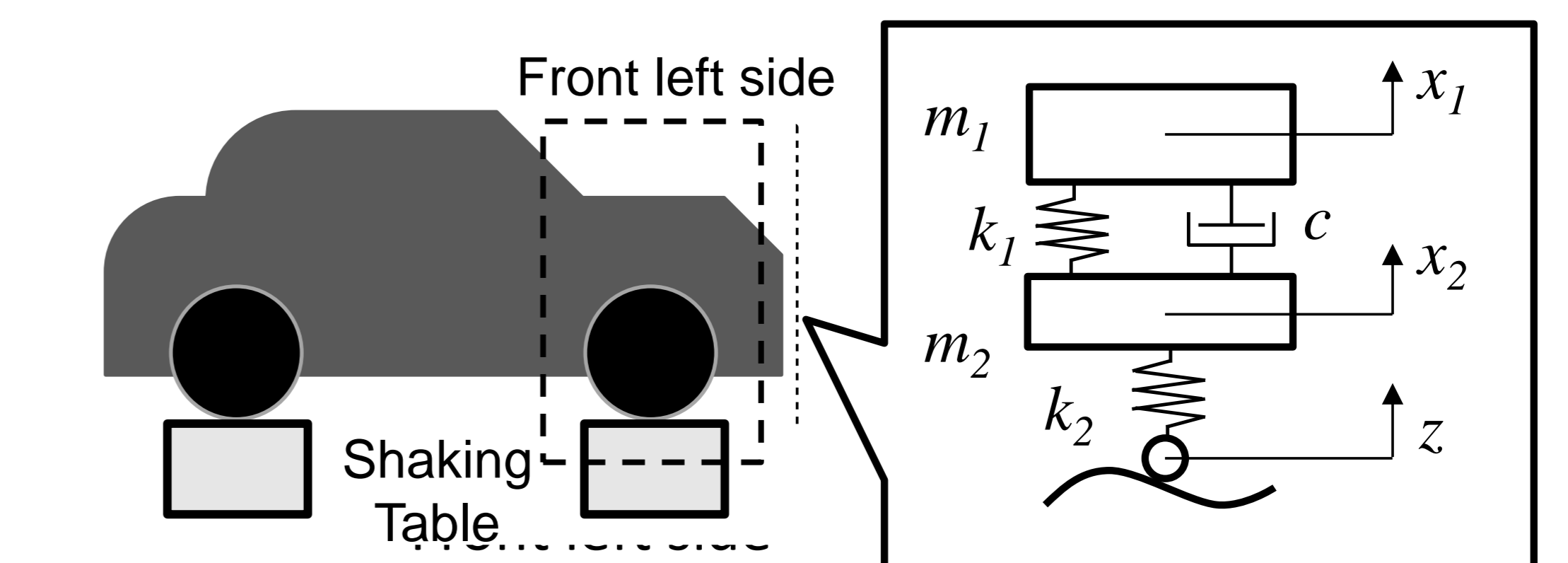
where s is Laplacian operator



Input estimation on rail vehicle bogie



Estimation on real vehicle



Red, Proposed ICA; Black, Conventional ICA; and Blue, Table Motion

Publications

Nakamura H., Nakano K., Uchiyama Y., Kakihara S., 2013, Application of Independent Component Analysis for Road Profile Estimation, Transactions of JSME Series C, 79(805), pp. 3002-3013.

Shimono K., Kaizuka T., Nakano K., Sakai E., Kono M., 2015, Estimation of Road Profile from Vehicle Body Acceleration by Independent Component Analysis, JSAE Annual Congress Proceedings (Autumn), pp.497-500, 14-16 October, Fukuoka, Japan.